

Scanning -- Shortwave -- Satellites -- Ham Radio -- Computers

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Monitoring Times--

Scanning Road Trip: Massachusetts to Dallas

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**The United Patriot Radio Story
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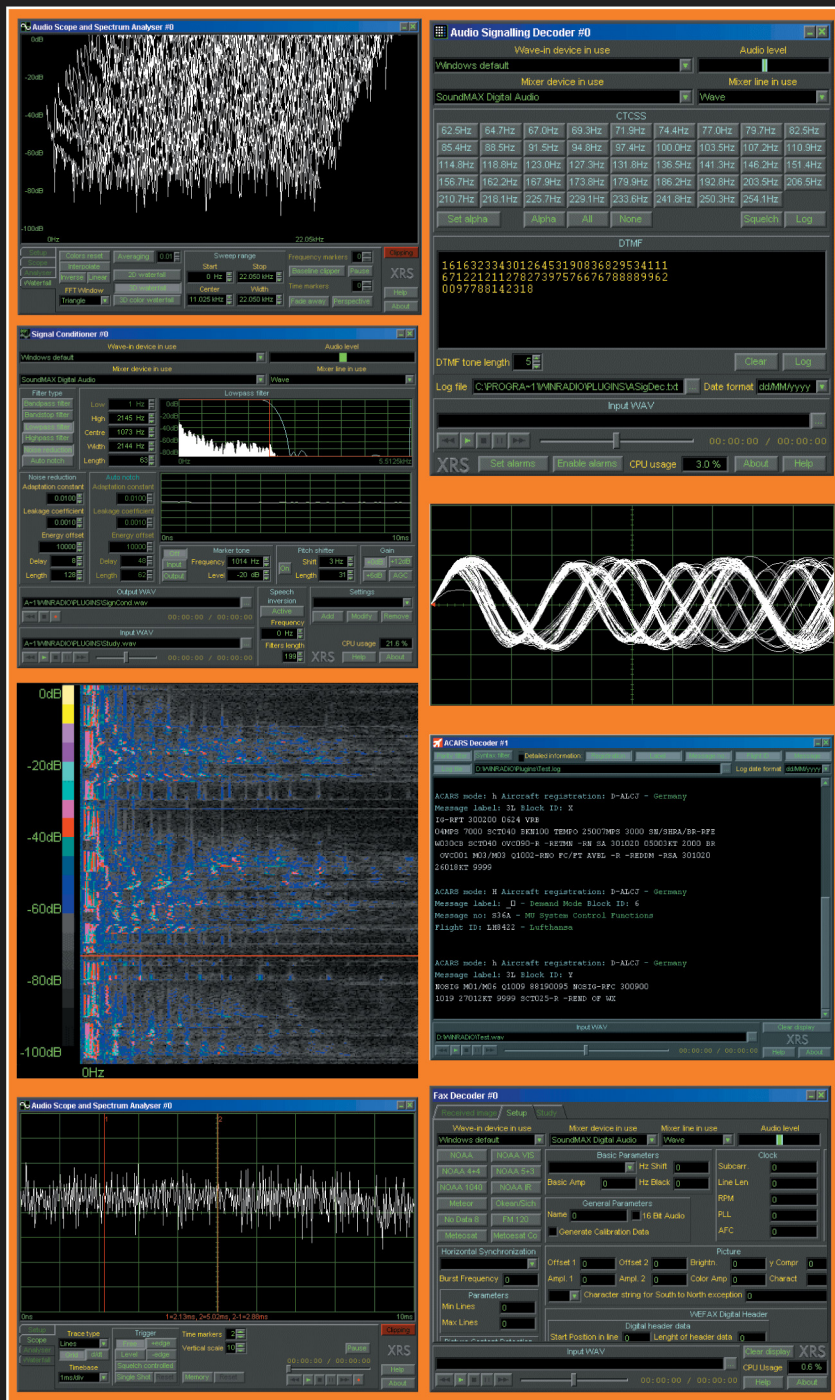
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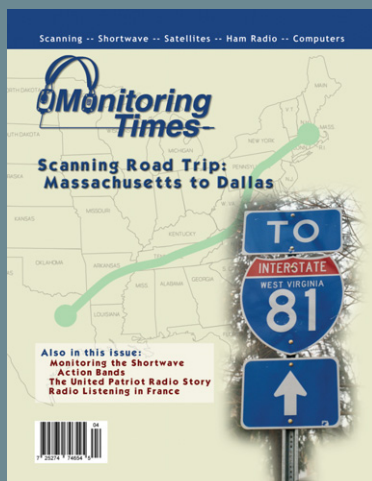


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Monitoring Times

Vol. 21, No. 4

April 2002



Lead Story

Road Trip: Massachusetts to Dallas

By John Mayson

Our intrepid traveler is on the road again – this time traveling the interstates from New Hampshire to Texas. With his scanner as a companion, Mayson has logged the public safety and related frequencies of most interest to the traveler. This installment travels I-84 for a short way through Massachusetts, Connecticut, New York, and Pennsylvania, where he picks up I-81 and hits Maryland, West Virginia, Virginia, and Tennessee. We'll complete the final section next month.

A separate sidebar also discusses issues to keep in mind when traveling with a scanner in this era of heightened security – especially if you're traveling by air.

Story starts on page 10.
Cover photo by John Mayson.

The Radio Landscape of France 14

By Michel Berlie-Sarrazin

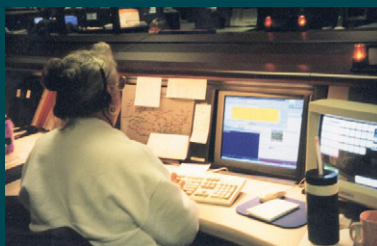
If you are longing to experience "April in Paris" or plan to join the hundreds of Americans who visit France throughout the year, you might find it educational to bring a radio along. Whether it's a small portable radio, a shortwave set, or a VHF/UHF scanner, you'll find lots to listen to. Here is a taste of the band plans and type of traffic you can discover while enjoying that famous French cuisine.



Who's Who in the Spectrum: Shortwave Action 17

By Larry Van Horn

By far the largest user of the shortwave bands is not international broadcasting, but two-way stations carrying out "utility" communications. This is the world at work – company communications, ships at sea, aircraft over oceans, embassies, and military and government communications, to name a few. Van Horn appropriately dubs these the "shortwave action bands." This is the fourth in our series analyzing the radio spectrum.



The Anderson/Patriot Radio Story 20

By Hans Johnson

Steve Anderson was a militiaman with a brief but fiery career as an unlicensed shortwave broadcaster; he is now at large and wanted for attempted murder and possession of explosives. This is the story of how he progressed through amateur radio, radio jamming, and broadcasting on shortwave without a license. It's also the story of the chaos he left behind.





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Owners

Bob and Judy Grove
judy@grove-ent.com

Publisher

Bob Grove, W8JHD
bgrove@grove-ent.com

Managing Editor

Rachel Baughn, KE4OPD
mteditor@grove-ent.com

Assistant Editor

Larry Van Horn, N5FPW

Art Director
Bill Grove

Advertising Svcs.

Beth Leinbach
(828) 389-4007
beth@grove-ent.com

Reviews:

As the Family Radio Service becomes increasingly popular, manufacturers search for a way to extend the range of new models and decrease their price. The new Radio Shack GMRS handi-talkie does just that with FRS, GMRS, and weather radio in one convenient, sturdy, affordable package (page 86).

The Tk8500 Project is open source software to control the Icom IC-R8500 receiver. Here is a brief

overview of the software and the designing process by its author, Bob Parnass (page 80).

A radio signal doesn't exactly leave a fingerprint, but each radio transmitter does emit certain telltale characteristics, especially during power-on. MoTron's TxID-1 software was designed to detect these differences in order to provide positive identifications – for example, on abusers on a repeater system (page 82).

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NTIA Report: Energy, Water, Railroads Need More Spectrum

The Federal Communications Commission and National Telecommunications and Information Administration manage the radio spectrum in the United States. NTIA manages the federal government's use of the radio spectrum. FCC, an independent agency of the federal government, has authority over commercial spectrum use, as well as the use of spectrum by state and local governments. Some believe they are on a collision course.

The NTIA is also the Executive Branch agency principally responsible for developing U.S. telecommunications policy. NTIA's responsibilities include establishing policies concerning spectrum assignments.

NTIA and FCC manage the spectrum through a system of frequency allocations. With the explosion of cell phones and other wireless devices, "spectrum" is the most valuable resource in the emerging information economy, worth hundreds of billions of dollars.

Spectrum ...commonly called "the airwaves"... is a publicly held common asset owned collectively by all Americans. The Communications Act of 1934 prohibits private ownership of spectrum, permitting only temporary licenses consistent with the "...public interest, convenience and necessity."

The vast majority of spectrum use for both the private sector and the Federal government is below 30,000 MHz (or 30 GHz). In the 0 to 30,000 MHz range, the government exclusive allocation is 7% (2271 MHz), non-government users have 30% (8961 MHz), and the remainder (63%) (18768 MHz) is shared.

Public Law (PL) 106-553 directed the NTIA to submit to Congress a study of the current and future use of spectrum by providers of energy, water, and railroad services to protect and maintain the Nation's critical infrastructure. The report was released on Friday, February 1.

As expected, the NTIA report concludes that in light of the Sept. 11 attacks more spectrum is needed for water, petroleum, and railroad providers to handle new wireless technology and increasing traffic loads. "The events of September 11, 2001, have underlined the importance of these industries and the role they play not only in our daily lives, but in times of

disaster response and recovery. When the World Trade Center collapsed, utilities needed to be shut off or restored. It was important for sufficient water pressure to be continuously available for firefighting, and when the airlines were grounded, people and commerce relied more on the railroad industry for transportation."

NTIA believes the significance of these industries and the urgency of these issues may have changed as a result of the September 11th events. The agency said "...it is of utmost importance that the

Federal Communications Commission revisit these critical issues in order to accommodate the increasing role these industries play in maintaining quality of life."

The report says that energy and water suppliers and the railroads are quickly using up the spectrum they are now allocated and that congestion is becoming a critical issue.

♦ Attacks Put Additional Pressure on Spectrum

"Access to the radio frequency spectrum is also critically important to federal, state, and local governments for national security, public safety, and other governmental functions. Specifically, while the national interest in a broad sense may be served by a robust commercial mobile wireless system, national security also requires that the federal government be able to meet its unique communications requirements to support domestic training and worldwide military operations. Thus, determining the proper use of a limited amount of spectrum, today and in the future, is a challenging and complex task due to competing industry and governmental demands." Quote from recent General Accounting Office report.

In light of the Sept. 11th terrorist attacks, defense officials have sharpened their focus on spectrum management, and frequency issues have been elevated to a higher level by Defense Secretary Donald Rumsfeld. It is reported that tension is mounting between the FCC and the NTIA. Industry needs spectrum for new commercial wireless ventures; the DoD is concerned about national security.

The Dept. of Defense has identified several areas in which it needs additional spectrum. Its mobile operations, including aeronautical, maritime, and land tactical uses, are currently conducted in the 30-88 MHz, 138-144 MHz, 225-400 MHz, and certain other bands. The DOD says it needs more VHF/UHF spectrum. Key uses for these mobile systems include combat net radios (voice and data), situational awareness (position location and reporting), and battlefield personal communications systems.

An NTIA study has determined that additional spectrum is also needed to support government aeronautical operations. Aeronautical mobile communications used by federal agencies is generally accommodated in the 2-23 MHz, 118-137 MHz, and 225-400 MHz bands.

There is also a growing concern about the lack of spectrum to accommodate future military and commercial aircraft flight testing telemetry operations, which are presently accommodated at 1435-1535 MHz, 2200-2290 MHz, and 2310-2390 MHz. "High-resolution digital video and the testing of unmanned aerospace vehicles will increase the demand for spectrum beyond that which can be satisfied by current allocations," NTIA said. It is estimated that an additional 300 MHz will be needed for future flight testing alone. The question is, where is all of the needed spectrum going to come from?

The General Accounting Office – the investigative arm of Congress – is the watchdog over all federal agencies. GAO primarily examines the use of public funds and evaluates federal programs and activities.

GAO said that, "Before making reallocation decisions with a significant impact on national security and the economic welfare of the nation, the federal government should approach the alternatives with knowledge gained from a sound and complete analysis." They recommended that the DoD complete a system-by-system analysis to determine current and future spectrum needs and prepare a long-range spectrum plan.

Heeding the GAO report, FCC Chairman Mike Powell is expected to appoint a "Spectrum Referee" to direct an interagency task force on frequency management. The NTIA, the Defense Department and other spectrum users are expected to be part of the task force which will "...define the problems and determine priorities."

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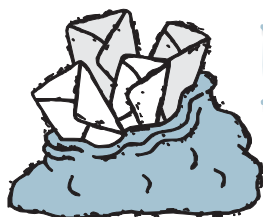
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LETTERS

TO THE EDITOR

Alternative Antenna Tower

"I found an interesting cellphone tower in western Boynton Beach, Florida. At first glance it appears to be a bell tower for the nearby church, but upon closer inspection you discover that it's actually a cellphone tower!"

"I wondered, do the bells really work, or are they there for show? I stopped at the church to ask them about it, and they said yes, they do work! The cellphone company is renting the piece of land that the tower sits on, and in exchange for allowing them to put it there, they painted it white and installed a working bell system (does that mean it's a 'Bell Cell'?)."

"I guess if you're going to put up a cellphone tower, might as well make it look (and sound) nice!"

— Brian J. Cathcart - KE4PMJ, *The Scanner Dude*

Reputation OnLine

In another follow-up to Bob Grove's September query "How does a visitor to the web know this is a dealer who can be trusted?" here is another tip for those considering buying products from a web based source:

"Before you buy, use a news group search engine such as Google.com to search for the company's name. You'll probably find several hits and from the messages other have posted you should be able to determine if the company is trustworthy or not."

— Bill S., Tucson, AZ

Thanks for the Recommendation

Similarly, Greg Price wrote to thank *Bright Ideas* columnist Gary Webbenhurst for recommending the website, <http://www.antennawarehouse.com>.

"Thank you for mentioning this outfit. I had been looking for some time to find such a site. Other sites just didn't seem to be that 'solid' — this one certainly was."

"I ordered two indispensable items — a mobile cell phone antenna/adaptor and an additional CB antenna to replace what was my wife's emergency antenna."

"The main point I want to stress is that I took your recommendation seriously and it panned out. Top notch service and information from both you and antennawarehouse."

— Greg Price

Get Your CHiPs Now

"I always wanted to hear the CHP (California Highway Patrol) on lowband skip ... had an elaborate setup at my old place with a tower and antennas aplenty with several 2006s going with Grove preamps, the whole 9 yards. Never did hear the CHP. Did hear (and work) 10 meter FM hams in California."

"Now, in my new location, all I have is the BC-895 I got from Grove and its little 1-foot antenna. And of course the CHP is coming in like gangbusters. Go figure."

"P.S.: Check out this excellent CHP website: <http://www.freqofnature.com/chp.htm> FYI this site says (in effect) that by the next solar maximum the CHiPs will be on a hybrid VHF/800 digital trunk system. Bottom line: better get your CHiPs while they're hot!"

— Ron Smith in Leeds, AL



Help for Heathkits

John Diefenbach recommends Milt Ferguson's collection of information, data and reference files for Heathkit products on Milt's website at <http://home.adelphia.net/~mfergy>. Thanks, John!

High-Tech in the Canadian Boonies

"These pictures (to the right of this letter -ed) are of a 'truck-tracking' radio receive/transmit site situated in the Oona River valley about 1-1/2 miles north of Oona River - a community of about 30 people 24 sea miles south of Prince Rupert, BC. This was built over the past two years, but never used, and no work has been done on it during the past year.

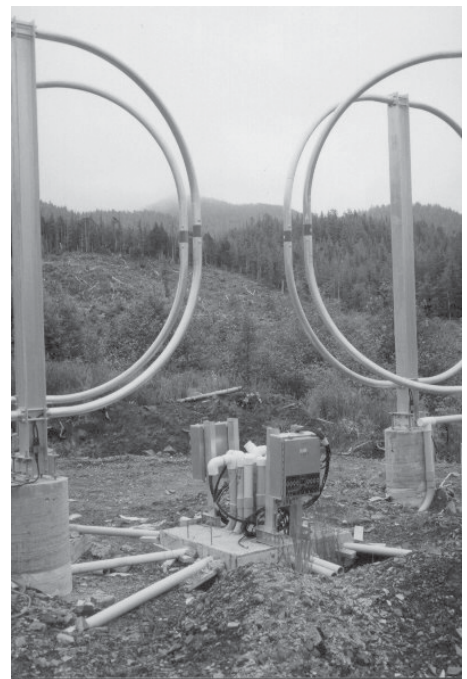
"The company who installed the site is Terion, I believe. I believe they had a really big 'lay-off.'"

- John Musgrave, Oona River, BC

Thanks, John. It looks like Terion is undergoing a Chapter 11 reorganization. Can anyone enlighten us about this unique antenna array? The tracking is done by GPS, but the data and dispatching apparently rely on a radio communications network.



60 kW John Deere diesel standby power plant in the white module. Radio equipment in shed with A/C on wall.



We welcome your ideas, opinions, corrections, and additions in this column. Please mail to **Letters to the Editor**, PO Box 98, Brasstown, NC 28902, or email mteditor@grove-ent.com. Letters may be edited for length and clarity. Happy monitoring!

-Rachel Baughn, KE4OPD, editor

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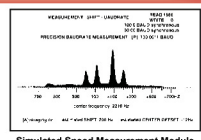
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AFRTS Contracts Boeing

U.S. Armed Forces Radio and Television Service programs are broadcast from a number of transmitters located around the world, including the Florida Keys on 4278.5 and 12689.5 kHz upper side band. Initially handled by the U.S. Navy when the broadcasts started in 1998, the day-to-day operation of the Florida Keys site has now been contracted out to Boeing.

Boeing tells *MT* that the transmissions are from the NCTS [Naval Computer Telecommunications Center] facility on Saddlebunch Keys, which are about 15 miles east of Key West. The station is visible to the north from U.S. Highway 1, but a locked gate, apparently a post-9/11 development, blocks entry. Two 1-kilowatt transmitters are connected to a couple of whip antennas. Both are operated 24 hours a day.

Although AFRTS Washington, D.C., has QSLed these transmissions, the site also welcomes reports. You can write them at: NCTS-Jacksonville-Detachment Key West, Building A1004, Naval Air Station Boca Chica, Key West, FL 33040

— by Hans Johnson

Paul's Voice Changing – at last!

Later this year you will hear a replacement for the software-generated voice of NOAA Weather Radio that has heavily grated on our ears since 1997, when live announcers were replaced by the near real-time data update afforded by the computer-generated voice of "Perfect Paul."

As a person who depends on current weather information for planning, I still miss the live announcers – their distinctiveness immediately identified which station you were receiving. In Southern California we frequently experience a temperature inversion layer which permits tropospheric ducting of VHF radio signals and makes possible reception of up to four NOAA Weather Stations aboard my boat offshore.

The artificial monotone-inflected cadence of NOAA's odd software voice is not only sleep-inducing, but is hard for many of us to understand. Also, some regional place names give Paul difficulty in good enunciation. Clearly, a replacement was indicated early on. A close boating friend actually called the Weather Bureau to strongly suggest they get a better public speaker to replace the "new guy."

It has taken NOAA some time to acknowledge that the intelligibility problem was valid and to come up with a solution. New software proposals have been undergoing listening tests with both male and female voices to replace Perfect Paul. After two years to evaluate software proposals, a new contract has been awarded to SpeechWorks, which developed a text-to-voice software called "Speechify."

The new "Craig" voice was highest rated in testing, with "Donna" not far behind. Many mariners said "Donna" was easier to hear and understand over engine noise. According to NOAA, the new software will build in context-

related inflections, yielding more naturalness to the broadcasts.

The new voice will be phased in this year at 121 weather forecast offices operated by NOAA, beginning with Melbourne, FL; Mount Holly, NJ; Des Moines, IA; and Portland, OR. The decision to use Craig, Donna, or a combination, will rest with the individual offices. Improved broadcast quality of NOAA Weather Radio may be a huge safety factor, benefiting us all.

— by Doug Robertson

FCC Actions: 24 GHz power boost

Against objections by the Amateur Radio Relay League (ARRL), the Federal Communications Commission (FCC) is going ahead with plans announced last August to allow fixed point-to-point transmitters in the 24.05 to 24.25 GHz band to operate at field strengths of up to 10 times the level currently permitted. To safeguard against interference, the FCC will require devices operating at these higher field strengths to use highly directional antennas. Amateur Radio is primary at 24.0 to 24.05 GHz and secondary on the rest of the band. The AO-40 satellite includes beacon, digital and analog transmitters in the vicinity of 24.048 GHz

"This band has accommodated unlicensed transmissions, government radar and amateur facilities with no major conflicts," the FCC said. "By allowing a greater variety of systems to occupy the band, we will provide the opportunity for innovative products and services to be made available to the American public as quickly as demand dictates." The FCC said those "innovative products and services" include managing network traffic on a high-speed wireless Internet service or connecting a multi-building intra-office network.

The entire 24.0-24.25 GHz band is allocated for use by Industrial, Scientific and Medical (ISM) equipment. In addition to Amateur Radio, the 24.05-24.25 segment is allocated on a secondary basis for radiolocation in the Private Land Mobile Radio Services and for Earth-exploration satellites. The band is adjacent to frequencies authorized for satellite Earth exploration and for radio astronomy and the Digital Electronic Message Service (DEMS).

FCC Actions: Fed freqs reallocated

On December 28th the Federal Communications Commission reallocated 27 megahertz of spectrum transferred from Federal Government use a few years ago for new flexible services. The 27 megahertz of reallocated spectrum is in the 216-220 MHz, 1390-1395 MHz, 1427-1429 MHz, 1429-1432 MHz, 1432-1435 MHz, 1670-1675 MHz, and 2385-2390 MHz bands. The action is intended to encourage introduction of new and innovative wireless technologies and further protect the status of Wireless Medical Telemetry Services and Low Power

Radio Services (such as auditory assistance and law enforcement applications).

On the 216-220 MHz band, fixed and mobile services are on a co-primary basis with the Low Power Radio Service (LPRS), and existing licensees in the Automated Maritime Telecommunication System (AMTS) receive additional flexibility. The FCC allocated the 1390-1392 MHz band to the fixed-satellite service (Earth-to-space) and the 1430-1432 MHz band to the fixed-satellite service (space-to-Earth) on a primary basis. The use of these allocations will be limited to feeder links for non-voice, non-geostationary mobile-satellite service (the "Little LEOs") and is contingent on the adoption of a similar international allocation at WARC 2003. The 1390-1392 MHz band, 1392-1395 MHz band, and the 1432-1435 MHz band are on a co-primary basis with the fixed and mobile (except aeronautical mobile) services on a co-primary basis, having determined that these services can successfully share spectrum with the Little LEO feeder uplinks.

The Wireless Medical Telemetry Service (WMTS) allocation is shifted from 1429-1432



April 6-7: Timonium, MD

Greater Baltimore Hamboree & Computerfest, sponsored by Baltimore ARC, located Maryland State Fairgrounds (Exit 16A off I-83), 8:00-5:00 Sat, 8:00-3:00 Sun. See <http://www.gbhc.org>, call 410-HAM-FEST, outside MD dial 800-HAM-FEST, or write PO Box 95, Timonium, MD 21094-0095.

April 14: Raleigh, NC

30th Annual RARSfest in the Jim Graham Building, NC State Fairgrounds on Hillsborough Street, 8a.m.-4p.m.; admission \$6. Talk-in 146.64. FCC and ARRL forums, walk-in exams (10a.m.), prizes, huge flea market, food. Visit <http://www.rars.org/hamfest>.

April 14: Stoughton, WI

Madison Swapfest at the Mandt Community Center at Stoughton Junior Fair Grounds on South Fourth Street, 8 a.m.; \$5 admission. Talk-in 147.15. For information <http://www.qsl.net/mara/>; 608-245-8890 or Madison Rptr Assoc, PO Box 8890, Madison, WI 53708-8890.

Saturday, April 20: Seal Beach, CA

Southern California Area DXers (S.C.A.D.S.) meeting: How to cope with radio interference. For updates check <http://www.ocnow.com/community/groups/radiocommunications>

April 26-28: Trenton, NJ

SETICon02, the 2002 SETI League Technical Symposium, 1p.m. Friday through 5 p.m. Saturday. (Followed on Sunday by The SETI League's 8th annual Membership Meeting) Hosted by The College of New Jersey, Ewing township (Trenton area) NJ. SETI League Awards Banquet; Keynote speaker, astronomer and historian Steven Dick; Banquet speaker, astronomer Chandra Wickramasinge. For details, <http://www.setileague.org/seticon/meet2002.htm>

MHz to 1427-1429.5 MHz as requested by the American Hospital Association to provide additional separation from high powered land mobile operations. The Order maintained the secondary status of non-medical telemetry systems in this band. The Order elevated telemetry to primary status in the 1429.5-1432 MHz band.

Some existing federal stations may be grandfathered indefinitely, but federal agencies are not to add new stations except in mixed-use bands. In the bands 1432-1435 MHz and 2385-2390 MHz, non-grandfathered Federal Government stations will retain their primary status until relocated in accordance with forthcoming rules to be issued by the National Telecommunications and Information Administration (NTIA).

FCC Actions: Public safety broadband

On February 14, the Federal Communication Commission (FCC) adopted a Second Report and Order and Further Notice of Proposed Rulemaking allocating 50 megahertz (MHz) of spectrum in the 4940-4990 MHz band (4.9 GHz band) for fixed and mobile wireless services and designating the band for use in support of public safety.

This allocation and designation will provide public safety users with additional spectrum to support new broadband applications such as high-speed digital technologies and wireless local area networks for incident scene management. The spectrum also can support dispatch operations and vehicular or personal communications. The 4.9 GHz band is allocated for fixed and mobile (excluding aeronautical mobile) use.

Public Safety searches for spectrum

In the ongoing effort to achieve interoperability between federal, state, and local agencies, Congress instructed the National Telecommunications and Information Administration (NTIA), the Federal Communications Commission, and the Department of Defense (DoD) to study the problem and perform an analysis of spectrum use. The DoD was also to study the feasibility of sharing frequencies in the 138-144 MHz band with non-federal public safety agencies, who wanted additional channels below 500 MHz.

We have not seen a DoD report, but the NTIA submitted that, in their search for comparable alternative frequencies within the Federal Government frequency bands between 100-1000 MHz, only the 162-174 MHz and 406.1-420 MHz federally allocated bands fulfilled the criteria.

On the other hand, they insisted these bands are already employing policies, rules and plans just to alleviate spectrum congestion. It concluded that "additional frequencies in the 162-174 MHz and 406.1-420 MHz bands, other than the 40 federal, state, and local public safety interoperability 12.5 kHz channels recently provided for in these bands, cannot be provided without jeopardizing the crucial missions of fed-

eral public safety agencies."

See *Washington Whispers* for more on an earlier NTIA report.

Shortwave Issues in Liberia

Although the trend in radio broadcasting in Africa has been toward FM frequencies, shortwave remains the only effective means of reaching audiences across the whole of Liberia. President Charles Taylor knows this, and has taken steps in the past to ensure that his is the only political voice on the shortwave dial in this west African country. His transmitter at Totota proved instrumental in his rise to power and it remains on the air as the Liberian Communications Network (LCN).

In the 1997 elections, political hopefuls, Alhaji Kromah and Kekura Kpoto, also chose to push their messages out on shortwave. In a bid to counter the unbalanced character of so much political broadcasting, two new shortwave radio stations were launched. Radio Star, billed as an independent media voice and bankrolled in Switzerland and America; and Radio Veritas, set up by the Catholic Church using a transmitter donated by the European Union. Star and Veritas both continued political programming after the election, but Taylor suspended them in March 2000. Crucially, Veritas was allowed to return to FM, but not to shortwave.

Taylor, under constant pressure to open up the airwaves to political opponents, has now offered two proposals. The first is simply to shut down his shortwave transmitter at LCN. The second is to make airtime available on the government network. Neither solution seems particularly attractive, as there is little evidence the president will allow open criticism to flourish. (He has only granted new shortwave licenses to religious radio stations.)

It may be, however, that while Taylor prevaricates over whether to allow independent radio, political parties may establish their own shortwave stations regardless of whether they have government approval. Pro-democracy groups may follow the example set by Zimbabwean exiles who have purchased airtime on shortwave transmitters located in South Africa and Madagascar. Such transmitters are available worldwide, and while more expensive than small local units, they offer added security from government intimidation.

— by Hans Johnson

Do It Yourself Satellite

Last fall, Naval Academy students and faculty built a small, bargain-basement satellite out of ordinary circuit boards, two dozen AA batteries recharged by solar panels, and antennas made out of sections of a metal measuring tape. Several months after its launch from Alaska aboard an Athena rocket, the satellite still orbits the earth every 100 minutes.

Though its life span may be from a few months to as much as three years, the mission is more than just an experiment. PCSat provides mobile and handheld satellite digital communi-

cations for operators in remote areas of the world not usually covered by satellite. Using the Automatic-Position-Reporting-System (APRS), PCSat augments the terrestrial system with a flying worldwide relay to extend APRS coverage globally.

For more on how to hear or work PCSat, visit <http://www.ew.usna.edu/pcsat>.

High Technology Hits Egypt

A satellite launched in 1992 – the 7,000 pound *Extreme Ultraviolet Explorer* – made an uncontrolled reentry of the atmosphere on January 31st. Any debris which may have survived the entry likely landed in central Egypt, according to radar tracking.

Power Struggle in Russia

Failure to pay the electric bill was the reason for cutting off power at the end of January to a Russian Space Forces facility on the Kamchatka Peninsula. The facility, part of the Russian network which controls and tracks the International Space Station as well as many other satellites, said it had to switch to diesel generators. However, the power company denied having cut power to the station control room; it says only dormitories and supply buildings experienced the power cuts.

Philippine Guerrillas Targeted

The U.S. has begun aerial surveillance over the southern region of the Philippines, according to a story in the *Washington Post*. It is hoped the stepped-up intelligence from the air combined with ground patrols by both U.S. and Philippine troops will put the squeeze on Abu Sayyaf, a rebel group with suspected ties to Al Qaeda. For the first time, Philippine commanders will be using secure radios for their communications.

Good-bye, Communications World

On February 23rd the Voice of America discontinued *Communications World* – a program on developments in international communications and broadcasting ably hosted by Kim Andrew Elliott since 1995. Kim Elliott will be returning to audience research, the post he held previously at VOA.

"Communications" is compiled by editor Rachel Baughn (mteitor@grove-int.com) from newscippings sent in by our readers. Many thanks to this month's reporters: Anonymous, Albany, NY; Bob Fraser, Cohasset, MA; Louis Johnson, Doraville, GA; W. Martin, Chicago, IL; Doug Robertson, Oxnard, CA; Brian Rogers, Melvindale, MI. Via email: Ed, Roger Cravens, Ed Cummings, John Diefenbach, Alan Henney, Hans Johnson, Dave Jones, Jeol Rubin, Bill Siedsma, John Stanko, Larry Van Horn, Peter Vieth, Dave White, Robert Wyman, Dave Zantow.



Road Trip: Massachusetts to Dallas

By John Mayson

Late last year I had the opportunity to drive halfway across the country, more specifically from New Hampshire to Texas. Knowing I would be driving a van with only an AM radio to entertain me for the 2,000-mile drive, I elected to pack my scanners and see what I could hear. I ended up filling half of a spiral notebook with various loggings. Most I have been able to identify. Some I will probably never identify.

I have taken this opportunity to organize my loggings, augmented by help from various people on the Internet, to profile four Interstate highways and what you can expect to hear while traveling along them. Over the next several articles we will travel I-84, I-81, I-40, and I-30. (See August 2001 feature by this author for New Hampshire scanner frequencies - ed.)

These articles are by no means intended as comprehensive county-by-county frequency listings. I could fill half this magazine with such a list. Instead I focus on frequencies and trunked systems that are active and relevant to the Interstate driver. State police, county sheriff and fire departments, and police and fire departments from major cities are heavy favorites.

I have worked hard to assure these lists are accurate. I have used everything from my own monitoring, emailing local listeners, and visiting local Radio Shack stores asking for frequency information. I encountered stretches of highway where I heard nothing on my scanner and had to fill those gaps with my best guess from the FCC database. Nothing can replace local knowledge. If you live in or visit the areas and have more accurate information, please email me at kc4vjo@qsl.net or write to me via this magazine. In either case, I will make sure

your information gets to our readers.

Interstate 84

Interstate 84 runs from near Sturbridge, Massachusetts, exit 9 of the Massachusetts Pike, and runs west to Scranton, Pennsylvania. Oddly, I-84 starts again near Echo, Utah, and runs to Portland, Oregon. I know of no other non-contiguous Interstate like I-84.

For purposes of this article, we will focus on the eastern part of I-84.

MASSACHUSETTS

Worcester County Massachusetts State Police TRS

Troop C
Motorola Type II analog
Frequencies: 855.3625, 855.6625, 855.9125, 859.2875, 859.4625

| Talkgroup | Description |
|-----------|----------------------|
| 33776 | Patrol 1 |
| 33808 | Patrol 2 |
| 33840 | Patrol 3 |
| 33872 | Special Operations 1 |
| 33904 | Special Operations 2 |
| 34448 | Special Operations 3 |
| 34480 | Detectives |
| 34608 | Special Services |
| 34928 | Auto Theft |
| 33936 | All Talk |

CONNECTICUT

The Connecticut State Police recently began using an ASTRO trunked system. The troopers were in dire need of a new radio system. The low-band system was antiquated twenty years ago and full of dead spots. Unfortunately for scanner lis-

teners the system is unmonitorable until Uniden offers their digital capable scanner.

A number inside parenthesis follows some of the frequencies. This is the CTCSS tone. CTCSS is the acronym for Continuous Tone Coded Squelch System. It's also known as a repeater tone, or by the Motorola trademark PL (Private Line). Repeater tone is a misnomer, since CTCSS tones are used also for simplex systems. Most radio systems use a CTCSS tone to reduce interference to neighboring systems using the same frequency. A subaudible tone is transmitted when the push-to-talk (PTT) button is pressed. The squelch of the receiving unit opens only when a specific tone is detected.

Tolland County

Vernon Police 460.375 (100.0)
Vernon Fire Department 33.48, 33.94
Tolland County Fire Communications 33.80

Hartford County

The city of Hartford uses an EDACS analog trunked radio system (TRS) for all city services. West Hartford operates a Motorola analog trunked system for the same purposes.

Remember, when programming an EDACS system into your scanner, the order of the frequencies is critically important.

Hartford Public Safety TRS

EDACS analog
1=854.9625, 2=856.4375, 3=857.4375, 4=858.4375,
5=859.4375, 6=857.9375, 7=857.9875, 8=858.7125,
9=858.9375, 10=858.9875, 11=859.7375, 12=859.9875,
13=860.7375, 14=860.9375, 15=860.9875, 16=860.4375

Hartford Police Department

| Talkgroup | Description |
|-----------|-------------|
| 06-020 | All Call |

| | |
|--------|------------------|
| 06-021 | Patrol North |
| 06-022 | Patrol South |
| 06-023 | NCIC Check |
| 06-024 | Detectives |
| 06-025 | Special Events |
| 06-026 | North Car-to-Car |
| 06-027 | TAC |
| 06-030 | Supervisors |
| 06-034 | Supervisors |

Hartford Fire Department

| Talkgroup | Description |
|-----------|----------------------|
| 04-041 | Dispatch |
| 04-042 | Incident 1 |
| 04-043 | Incident 2 |
| 04-044 | Incident 3 |
| 04-045 | Incident 4 |
| 04-047 | Training |
| 04-060 | Prevention |
| 04-061 | Prevention |
| 04-062 | Investigation |
| 04-063 | Arson Investigations |
| 04-080 | Special |
| 82-82 | Alarm And Signals |

West Hartford TRS

Motorola Type II analog
866.0750, 866.3250, 866.8000, 868.2875, 868.8125

West Hartford Police Department

| Talkgroup | Description |
|-----------|---------------|
| 16 | All Talk |
| 48 | Supervisors |
| 80 | Patrol 1 |
| 112 | Patrol 2 |
| 144 | Tactical 1 |
| 176 | Tactical 2 |
| 208 | Investigation |
| 240 | Dispatch |

West Hartford Fire Department

| Talkgroup | Description |
|-----------|--------------|
| 2416 | All Talk |
| 2448 | Intercity |
| 2480 | Fireground 2 |
| 2512 | Fireground 3 |
| 2544 | Fireground 4 |
| 2608 | Fire Code |
| 2640 | Dispatch |

New Haven County

One of the principal cities in New Haven County, Waterbury, uses an EF Johnson analog trunked system. Below is a list of system frequencies.

Waterbury Public Safety TRS

866.1875, 866.3375, 866.5875, 866.8375, 866.9000, 867.1125, 867.1750, 867.9000, 868.6500

Fairfield County

| | |
|--------------------------------------|---------|
| Danbury Police Department | 460.550 |
| Fairfield County Fire Communications | 33.86 |

NEW YORK

Welcome to the Empire State. We'll travel through three counties: Putnam, Dutchess, and Orange. This area is covered mostly by a wide-area EDACS system, but conventional frequencies are still widely heard.

I enjoy traveling through this section of New York. The lower Hudson River Valley is beautiful. The United States Military Academy is here as are rolling hills and wineries. Some of these communities re-

fer to themselves as civil servant ghettos since many New York City emergency personnel live upstate to avoid the high cost and high stress of living in the City. Sadly these communities were hit hard by September 11.

Putnam County

Putnam County Sheriff's Office

| Frequency | Channel | Description |
|-----------|---------|-------------|
| 155.985 | 1 | Dispatch |
| 745.745 | 7 | |
| 154.725 | 10 | |

Putnam County Fire Department

| Frequency | PL | Channel | Description |
|-----------|-------|---------|-------------|
| 46.38 | 123.0 | 1 | Dispatch |
| 46.50 | 123.0 | 2 | Fireground |
| 46.30 | 123.0 | 3 | Fireground |
| 46.04 | 123.0 | 4 | Alternate |
| 45.88 | CSQ | 5 | Mutual Aid |

Dutchess County

Poughkeepsie Public Safety TRS

EDACS analog
1=854.4125, 2=853.2625, 3=852.6875, 4=856.7125, 5=860.7125, 6=861.2375, 7=862.2375, 8=863.2375, 9=864.2375, 10=865.2375, 11=855.3125, 12=859.8875

Dutchess County Sheriff's Office

| AFS | Description |
|--------|-------------|
| 03-077 | Dispatch |
| 03-041 | |
| 03-045 | |

Dutchess County Fire Communications

46.36 (CSQ)

Orange County

Orange County Public Safety TRS

EDACS analog
East system: 1=851.5875, 2=852.0125, 3=857.7125, 4=865.7125, 5=861.7125, 6=862.7125, 7=863.7125, 8=864.7125, 9=866.6000

Orange County Sheriff's Office

| AFS | Description |
|--------|--------------|
| 04-022 | Polling |
| 04-023 | Interservice |
| 04-037 | Central |

Newburgh Police Department

| | |
|--------|----------|
| 04-121 | Base |
| 04-122 | Tactical |
| 04-126 | Tac-1 |

PENNSYLVANIA

Pike County

| | |
|---------------------------------|----------------------------------|
| Pike County Police Department | 155.625, 154.650 |
| Pike County Fire Communications | 46.18, 153.770, 153.950, 154.445 |

Wayne County

Wayne County Police Department

156.150, 159.150

Wayne County Fire Department

33.78, 154.205, 154.310

Interstate 81

Interstate 81 is a major north-south artery in the eastern United States. It starts at the St. Lawrence River in Jefferson County, New York, and passes through very scenic real estate and ends in Jefferson County, Tennessee.



As you can imagine, I-81 passes through scores of counties, cities, townships, and various other jurisdictions. Because of this, I will narrow the scope of the article, and concentrate on the most active frequencies, typically covering a county or major city.

Additionally, we will not cover the New York section of I-81 in this article, since my journey did not take me through central New York. However, I will direct you to the excellent web page full of New York information: http://www.nf2g.com/scannist/nys_index.html

PENNSYLVANIA

We start our journey down I-81 in Pennsylvania. This part of the country has retained its low band equipment. The Pennsylvania State Police can still be found on VHF frequencies; however, Governor Tom Ridge, who now serves as our Homeland Defense chief, approved the construction of an ASTRO trunked radio system for the entire state.

Susquehanna County

Pennsylvania State Police - Troop R

155.580/154.950 (186.2)

Susquehanna County Sheriff's Office 37.10

Susquehanna County Police Department 154.725

Susquehanna County Fire Department 33.8, 86, 33.80

Lackawanna County

Pennsylvania State Police - Troop R

155.445 (186.2)

Lackawanna County Sheriff's Office

151.490, 460.225

Lackawanna County Police Department

| Output | Input | Usage |
|---------|---------|--------|
| 154.875 | 158.910 | Zone 1 |
| 154.815 | 158.970 | Zone 2 |
| 155.790 | 159.210 | Zone 3 |

Lackawanna County Fire Communications

| Freq | Usage |
|---------|----------|
| 154.310 | Dispatch |
| 33.86 | Low-band |
| 453.600 | |

460.575

460.625

Scranton Police Department

| Output | Channel |
|---------|---------|
| 453.375 | 1 |
| 453.700 | 2 |
| 453.850 | 3 |

Scranton Fire Department

| Freq | Usage |
|---------|----------|
| 453.500 | Dispatch |
| 460.500 | |

Luzerne County

Luzerne County Sheriff's Office

154.890/155.415 Dispatch

Luzerne County Fire and EMS 155.025/159.465 Dispatch

Pennsylvania State Police

| Output | Input | PL | Troop |
|---------|---------|-------|-------|
| 155.670 | 155.910 | 186.2 | N |
| 155.505 | 155.850 | 186.2 | P |

Luzerne County Police Department

| Output | Input | Usage |
|---------|---------|----------|
| 154.740 | 155.700 | Dispatch |
| 155.595 | 158.730 | Zone A |
| 158.985 | 151.265 | Zone B |
| 155.565 | 151.370 | Zone C |
| 155.535 | 155.070 | Zone D |
| 158.745 | 155.925 | Zone E |
| 153.860 | 155.760 | Zone F |
| 156.225 | 158.805 | Zone G |

Wilkes-Barre Police Department

| Output | Input | Channel |
|---------|---------|---------|
| 154.845 | 156.090 | 1 |
| 154.800 | 158.895 | 2 |
| 155.970 | simplex | 3 |

Schuylkill County

Pennsylvania State Police - Troop L

155.505/155.850 (186.2)

Schuylkill County Sheriff's Office 155.715

Schuylkill County Police Department

| Output | Channel |
|---------|---------|
| 155.805 | 1 |
| 155.745 | 2 |
| 155.955 | 3 |
| 153.785 | 4 |

Schuylkill County Fire Communications

| Freq | Usage |
|-------|------------|
| 46.50 | Dispatch |
| 46.48 | Fireground |
| 46.36 | Fireground |
| 46.32 | Fireground |
| 46.24 | Fireground |

Lebanon County
 Pennsylvania State Police - Troop L
 155.505/155.850 (186.2)

| Lebanon County Police/Sheriff's Office | Output | Channel | Usage |
|--|--------|---------|----------|
| | 37.26 | 1 | Dispatch |
| | 37.24 | 2 | |
| | 37.10 | 3 | |
| | 45.10 | 4 | |

Dauphin County
 Harrisburg Police Department 156.210 Dispatch

| Pennsylvania State Police - Troop H | Output | Input | PL |
|-------------------------------------|---------|---------|-------|
| | 155.580 | 154.950 | 186.2 |
| | 155.670 | 155.670 | 186.2 |

| Capitol Police | Output | Channel |
|----------------|---------|---------|
| | 453.300 | 1 |
| | 453.100 | 2 |

| Dauphin County Police Department | Output | Channel | Usage |
|----------------------------------|---------|---------|------------|
| | 460.075 | 1 | Central |
| | 460.025 | 2 | South |
| | 460.100 | 3 | Countywide |
| | 460.050 | 4 | North |
| | 460.225 | 5 | North |

| Dauphin County Fire Department | Output | Channel | Usage |
|--------------------------------|--------|---------|------------|
| | 33.80 | 1 | Dispatch |
| | 33.84 | 3 | Fireground |
| | 33.86 | 4 | |
| | 33.90 | 5 | |

| Harrisburg Fire Department | Output | Channel |
|----------------------------|---------|---------|
| | 453.700 | 1 |
| | 453.975 | 3 |

Cumberland County
 Pennsylvania State Police - Troop H
 154.665/158.910 (186.2)

| Cumberland County Police Department | Output | Channel | Usage |
|-------------------------------------|--------|---------|--------------|
| | 45.90 | 1 | Dispatch |
| | 45.86 | 2 | |
| | 45.82 | 3 | Unit-to-Unit |

| Cumberland County Fire Department | Output | Usage |
|-----------------------------------|--------|--------------|
| | 46.06 | Dispatch |
| | 46.12 | Fireground |
| | 46.22 | Unit-to-Unit |
| | 46.44 | |

Franklin County
 Pennsylvania State Police - Troop H
 155.670/155.910 (186.2)

| Franklin County Police Network | Freq | PL | Channel |
|--------------------------------|-------|-------|---------|
| | 45.62 | 186.2 | 1 |
| | 45.64 | 186.2 | 2 |

| Franklin County Fire Communications | Freq | PL | Channel | Usage |
|-------------------------------------|-------|-------|---------|------------|
| | 46.16 | 186.2 | 1 | Dispatch |
| | 46.10 | 186.2 | 2 | Fireground |
| | 46.36 | 186.2 | 3 | Fireground |
| | 46.08 | 186.2 | 4 | Fireground |
| | 46.42 | 186.2 | 5 | Mobiles |
| | 46.46 | 186.2 | 6 | Mobiles |

MARYLAND

son-Dixon line into Maryland. I-81 meanders through Maryland for less than eleven miles and only one county. However, there are still a few frequencies you will want for your scanner.

Washington County
 Maryland State Police
 Freq PL Chan Description
 39.34 110.9 A05 Barrack 0 - Hagerstown

Washington County Sheriff's Office
 Freq Chan
 39.18 1
 39.60 2

Washington County Fire Department
 Freq Description
 33.86 Dispatch
 33.16
 33.80
 33.82
 33.84
 33.08 Western Maryland Fire Mutual Aid
 154.28 Mutual Aid

Hagerstown Police Department
 Freq Chan Description
 856.7125 1 Patrol
 857.7125 2 Patrol
 864.6625 Detectives
 865.6375

WEST VIRGINIA

Much like Maryland, I-81 passes through a single West Virginia county. However, it covers more than twice as many miles.

I had quite an interesting experience in West Virginia. I met KE3VIN, Kevin Inscoc, a long time Internet friend in Martinsburg. It was one o'clock in the morning and we were driving around the city looking for a restaurant that was open. I didn't have any ham gear on me, so I monitored the local repeater from my van while Kevin worked a local ham who gave us directions. After many wrong turns that at one point led us to a trailer park, the repeater operator came up and got us to where we were going.

If you're ever in the area and have 2-meter privileges, be sure to check out W8FSE's repeater, 145.15-.

Berkeley County
 Berkeley County Sheriff's Office 453.975
 Berkeley County Police Department 453.525

West Virginia State Police
 Freq Description
 42.06 Company C - Martinsburg
 42.10 Statewide
 39.98 Statewide Sheriff's Net

Berkeley County Fire Department
 Freq Chan Usage
 33.90 1 Dispatch
 33.96 2 Fireground

Have scanner, will travel

Today we divide time into two segments: before September 11, 2001, and after. Events of that day have literally changed the world. It has impacted travel more than anyone would have imagined.

At the time of writing this article, I have made three plane trips since 9/11, two of which crossed a national border. I have also driven across a dozen states, three of which were directly impacted by the attacks.

Driving, I would say, has changed for the better. From northern New England to the heart of Texas, I saw American flags flying from cars, trucks, overpasses, and billboards. Drivers seemed more courteous. Restaurant and motel operators sincerely welcomed travelers. I actually had conversations with fellow travelers at rest areas. The entire country had a much different feel to it.

Air travel is another story. Everyone I have encountered from flight crews to security personnel to Customs agents, have all been courteous. But their jobs have been made infinitely more difficult.

A common question on several Internet mailing lists involves flying with scanners or other radio equipment. I do not work for the FAA or the airline industry, so I do not speak with any sort of authority on flying with scanners. However, I can tell you the experiences I have had, added with a dash of good common sense.

1. Assume everything will be searched. Both your carry-on and checked baggage are subject to x-ray and physical searches.

2. Compartmentalize. This is something I always have done. I prefer traveling with a backpack; it gives me that George Harrison traveling through India feeling. Also, it keeps my hands free, making it easier to show my ticket and ID. I have always packed by placing items in smaller bags inside my backpack. This is a really good idea today. You might be asked to turn on your electronic gear. It's easier if you can grab one smaller bag out and deal with that. Also, in the event of a full search, it can go more smoothly if you can pull out smaller bags and tell security what it is. If a bag contains nothing but dirty underwear, they might be willing to wand the bag and move on rather than sharing your undergarments with fellow passengers.

3. Arrive early and cooperate. I have seen too many travelers complain to security that they're about to miss their flight because of them. I can't say security treats them any differently, but it's just good common sense. If you appear calm, unhurried, and cooperative, the screening will go more smoothly.

4. If you have a ham radio license, bring it, even if you're only carrying scanners. No, you don't need a ham license to possess a scanner, but by showing that to airport security, it seemed to legitimize my monitoring gear.

5. Make sure you can power up all of your gear. Security can ask you demonstrate everything works. Have fresh batteries and bring AC adapters if needed. In Canada, if your electronics do not work, they'll confiscate them.

6. Don't bring undue attention to yourself. For instance, assume your scanners will be turned on and make sure they tune in NOAA Weather Radio or a local broadcast station, versus, say, the local FBI repeater or airport police. If you have a lot of antennas, coax, or computer interface cables, check them with luggage. Loose wires make folks nervous.

7. Answer questions honestly, but don't over-elaborate. During one trip, a security worker mistook my Uniden BC780 for a CB radio. I just let that go and didn't try to correct him. If asked directly, you're probably better off describing your gear as a "communications receiver" rather than a "police scanner." If you're asked to elaborate, say it receives amateur and other land-mobile communications. Don't offer to show them a neat trick by tuning in their radio frequency and asking them to hit their PTT button.

8. Choose non-stop or direct flights. Every time you board an aircraft, you're subject to a random search. Non-stops will minimize that number to one. A direct flight is one where the flight number doesn't change, but makes one or more intermediate stops. In general, the same plane is used and passengers may stay on the plane, thereby eliminating an opportunity for a random search. Remember, this is not always the case. My flight from Calgary to Dallas/Fort Worth continued on to Houston-Bush. Even though US Customs is located at Calgary airport, Houston-bound passengers were asked to deplane and board a different plane for the continuation of their flight.

9. Be mindful of how you pack. I was passing through security in Calgary when the x-ray operator yelled, "Seize that bag" pointing to my backpack. She seemed a little more alarmed than I would have expected. I found out why from another security agent. I had a large brick of "AAA" batteries in the same small bag with my 90° scanner antennas. On an x-ray it looked like a box of bullets and a small pistol. Whoops.

We have now crossed the Ma-



VIRGINIA

I-81 through Virginia is 323 miles long and takes travelers through the beautiful Shenandoah Valley.

Sometimes I think I have learned more from this hobby about local and state governments than I ever learned in school. Virginia has a unique political subdivision called an independent city. In most states, the county asserts varying degrees of authority over the cities within its boundaries. In Virginia, many cities are autonomous and independent of the counties in which they reside, even if the city serves as the county seat. Why do I mention this? For purposes of this article, I'm going to list independent cities under the county name. Also, when you read seemingly incongruous agency names such as the "city sheriff" you'll know I'm not crazy; it's a Virginia thing.

Frederick County (includes Winchester)
Frederick County Sheriff's Office
 Freq PL
 155.010 D311
 453.900 167.9

Shenandoah County
New Market Police Department 453.700 (151.4)

Rockingham County
 (includes Harrisonburg)
Rockingham County Sheriff's Office 460.200

Augusta County (includes Staunton)
Staunton-Augusta County Rescue Squad
 460.550

Augusta County Sheriff's Office
 Freq PL
 460.300 Digital
 460.400 D065

Rockbridge County (includes Lexington)
Rockbridge County Sheriff's Office 460.225
Lexington Fire Department 453.125 (186.2)

Botetourt County
Botetourt County Sheriff's Office
 Freq Channel
 39.42 1
 39.54 2

Botetourt County Fire Department
 Freq Channel
 45.40 1
 45.52 2

Roanoke County
 (includes Roanoke and Salem)
Virginia State Police
 Output Input CTCSS Channel
 158.985 154.905 167.9 11
 159.000 154.935 127.3 12

Roanoke City/County Motorola Type IIi TRS
 4625, 857.7375, 857.7625, 857.9625, 858.4375,
 858.4625, 858.9625, 859.2125, 859.2625,
 859.4375, 859.4625, 859.9625, 860.2125,
 860.2625, 860.4375, 860.4625, 860.9625, 861.9625

Fleet map: S4, S4, S4, S4, S0, S0, S0, S0

Roanoke County Sheriff's Office
 Talkgroup Channel
 300-06 1
 300-07 2
 300-08 3
 300-09 4
 300-10 5

Roanoke County Police Department
 Talkgroup Channel Description
 200-01 1 Dispatch
 200-02 2
 200-03 3
 200-04 4
 200-05 5
 200-10 6 All Talk
 200-13 7 CID
 200-08 8 Community Service
 200-11 11 Supervisors
 200-06 SWAT
 200-09 Vice

Roanoke City Police Department
 Talkgroup Channel Description
 35888 1 Dispatch
 35920 2
 35952 3
 35984 4
 35856
 35872
 35984 SRO
 36080 Tactical Response Team - 1
 36112 Tactical Response Team - 2
 36144 Vice - 1
 36184 Vice - 2
 36272 CID

Roanoke City Fire Department
 Talkgroup Channel Description
 000-01 TAC 01 Dispatch
 37424 TAC 02

37456 TAC 03
 37488 TAC 04
 37520 TAC 05
 37552 TAC 06
 37584 TAC 07
 37808 TAC 08
 100-10 TAC 10 Mutual Aid
 37840 TAC 11 Operations
 37776 Fire Prevention

Roanoke City Sheriff's Office
 Talkgroup Channel
 37904 1
 37936 2

Roanoke County Fire Department
 Talkgroup Channel Description
 100-01 TAC 01 Dispatch
 100-02 TAC 02
 100-03 TAC 03
 100-04 TAC 04
 100-05 TAC 05
 100-06 TAC 06
 100-07 TAC 07
 100-10 TAC 08 Mutual Aid
 100-11 TAC 09 Mutual Aid
 100-08 TAC 10 All County
 100-09 TAC 11 Fire Prevention
 100-12 TAC 12 Emergency Services
 100-13 TAC 13
 100-14 TAC 14
 100-15 TAC 15

Vinton Police Department
 Talkgroup Channel Description
 300-04 1 Dispatch
 300-02 3 Patrol
 300-01 Traffic
 300-02 Detectives
 300-05 Supervisors

Salem Police Department
 Freq Chan
 453.225 1 - Dispatch
 453.950 2
 453.325 3

Salem Fire Department
 Freq Chan
 453.475 1 - Dispatch
 453.325 2
 453.600 3

Montgomery County
 (includes Christiansburg)
Virginia State Police 158.985/154.905
Montgomery County Sheriff's Office
 39.20, 39.24, 39.50, 39.54, 452.300, 452.350
Christiansburg Police Department 39.94
Christiansburg Fire Department
 45.44, 154.340

Montgomery Fire Department
 Freq Channel
 45.32 1
 45.44 2
 45.88

Pulaski County
Pulaski County Sheriff's Office
 453.500, 453.600

Wythe County (includes Wytheville)
Virginia State Police
 Output Input CTCSS Channel
 159.000 154.935 127.3 7
 159.165 155.445 167.9 8

Wythe County Sheriff's Office
 154.785/156.090 Dispatch

Wytheville Police Department
 154.860/156.030 Dispatch
Wytheville Fire Department
 154.325/153.770 Dispatch

Smyth County
Smyth County Sheriff's Office 453.550

Washington County (includes Bristol)
Washington County Sheriff's Office 460.225
Washington County Fire Department 39.50

TENNESSEE

While I have never lived in the Volunteer State, Tennessee remains one of my favorite places. I enjoy the beauty of the Great Smoky Mountains, the busy cosmopolitan life of Nashville, and the excitement of Memphis' Beale Street. However, not all is perfect with Tennessee. Nashville-Davidson County uses a digital ASTRO system and the city of Memphis uses a non-APCO-25 compliant digital system. Shelby County has a digital AEGIS system; however, during my visit they operated this system in analog mode. Scannists in Nashville will have to wait until an APCO25 digital capable scanner becomes available. Unfortunately for Memphis and Shelby County scannists, the digital modes used are proprietary modulation schemes, and it's highly unlikely a commercial scanner will ever be offered.

We will finish the last eighty-three miles of I-81, ending in Jefferson County. Next month we will head west on I-40 starting with Sevier County.

Tennessee Highway Patrol
 42.28, 42.36, 42.42, 42.56, 42.60, 45.58, 45.62,
 45.66, 45.70, 45.82

Sullivan County
Sullivan County Sheriff's Office 155.940
Bristol Police Department 155.640, 155.700
Kingsport Police Department 155.010
Kingsport Fire Department 155.055
421 Area Emergency Services 154.175

Washington County
Washington County Motorola Type IIi TRS
 856.2375, 856.4625, 857.2375, 857.4625,
 858.2375, 858.4625, 859.2375, 859.4625,
 860.2375, 860.4625 MHz

Fleet map: S1, S0, S3, S10, S4, S4, S12, S0

Greene County
Greene County Fire 154.400
Greenville Police Department
 155.550/154.785 Dispatch

Hamblen County
Hamblen County Fire Department
 46.50/46.06 Dispatch

Jefferson County
Jefferson County Sheriff's Office 460.475
Jefferson County Fire Department 460.600

The Radio Landscape of France

By Michel Berlie-Sarrazin



Americans have been traveling to France for a long time, and the number of visitors continues to increase. Perhaps you are thinking (or have already decided) to come to France. I hope this article will give you practical and useful information for your future journey in my country – from the radio perspective, naturally.

Listening to Europe

Why would you want to travel in Europe (and France) with your HF (shortwave) receiver and/or with your VHF/UHF scanner?

First, to keep in touch with your homeland, by means of the Voice of America SW transmissions, or perhaps through the BBC World Service. Or, for one of many other excellent reasons. To catch stations that are elusive in America and easily heard in Europe. To discover the LW band (150 to 400 kHz) and its mammoth stations (2 megawatts ERP for France Inter on 162 kHz), unique to ITU Region 1. To experience a curiosity – the European MW band, crowded every night with stations from all over the continent, transmitting

in tens of different languages. Contrary to America, MW channels are in 9 kHz steps here instead of 10 kHz. (Remember to change your receiver option on this point, as is possible on Sony and other portables.) Do not miss the FM band and its wide variety of thematic stations.

Your HF receiver is now in your luggage, with your *Passport to World Band Radio* or *World Radio TV Handbook*. This is fine, but do not forget that power plugs and sockets are different compared with American ones. They are of different shapes in France, Germany, Great Britain, etc. ... So you will need to get a specific adapter for every country, bought in the USA or upon your arrival in Europe.

The most common mains voltage is 220 V and 50 Hz. In America you are on 110 V and 60 Hz. If your receivers work only with batteries, no problem; likewise if your receiver gives you the ability to choose and change the voltage. If they are only on 110V, you need to buy a small, 220 V to 110 V transformer with a low power capacity of few tenths of Watt, as portable receivers don't require high power.

The voltage is the first part of the problem; the other concern is the frequency of the mains. This is important only for equipment with synchronized motors. If you try to use, for example, a recorder, a video recorder or a turntable that contains such devices, it will work more slowly in Europe than in America (20 percent under the nominal tape or disk speed). You can correct this in one of two ways: change some mechanical parts (more often than not, the capstan) in the apparatus,

or use a static converter able to transform the 220 V 50 Hz into 110V 60 Hz through a double stage. First from alternative 50 Hz to continuous voltage, and continuous to 60 Hz alternative voltage (whew!).

If you travel with a TV set, it must be compatible with PAL (Europe) or SECAM (mainly France and Russia) video standards.

Miscellaneous Utility Frequencies

Maritime

If you are maritime minded, listen to coastal traffic on the HF marine band. There's always the possibility you may intercept Search and Rescue calls on 2182 MHz, 3023 MHz, 5680 MHz (old system) or on 2182, 4125, 8291, 12290, 16420 MHz (new system).

The French Fishing Fleet

Transmit: 4411 kHz and 1671 kHz (backup: 3722 kHz)
Receive: 4119 kHz and 2096 kHz (backup: 3317 kHz)

| Fishing Radio (harbors) | Schedule (UTC) | Fish auction schedule (UTC) |
|-------------------------|----------------|-----------------------------|
| Open sea | 0900 to 0910 | 1135 to 1140 |
| Les Sables d'Olonne | 0920 to 0930 | 1130 to 1135 |
| Yeu | 0930 to 0940 | 1125 to 1130 |
| Concarneau | 0940 to 0955 | 1120 to 1125 |
| Douarnenez / Audierne | 0955 to 1005 | 1115 to 1120 |
| Penmarc'h | 1005 to 1020 | 1110 to 1115 |
| Loctudy / Lesconil | 1020 to 1040 | 1105 to 1110 |
| Le Guilvinec | 1040 to 1100 | 1100 to 1105 |

Ships and Coastal Stations, Worldwide Coverage

HF radiotelephony communications, all frequencies kHz

MONACO RADIO (Monaco Principality)

Duty schedule: 0700 to 2300 local time

Frequencies watch schedule: same as duty schedule

| Transmit | Receive |
|----------|---------|
| 4363 | 4071 |
| 8806 | 8282 |



| | |
|-------|-------|
| 13152 | 12305 |
| 17323 | 16441 |
| 22768 | 22072 |

MONACO RADIO (Monaco Principality)
0930 UTC

Meteorological bulletins or warning after preliminary announcement on 2182 kHz

| | |
|-------|-------|
| 4363 | 17323 |
| 8806 | 22768 |
| 13152 | |

BERNE RADIO (Switzerland)

Duty schedule: 0700 to 2300 local time

Frequencies watch schedule: same as duty schedule

| Transmit | Receive |
|----------|---------|
| 4378 | 4086 |
| 8782 | 8258 |
| 13164 | 12317 |
| 17272 | 16390 |
| 22789 | 22093 |

MADRID RADIO (Spain)

Emitting Power: 10 kW

| Transmit | Receive | Watch schedule |
|----------|---------|----------------|
| 4387 | 4095 | 2200 to 0500 |
| 8728 | 8204 | H 24 |
| 8746 | 8222 | 2100 to 0600 |
| 13077 | 12230 | H 24 |
| 13176 | 12329 | H 24 |
| 17329 | 16447 | 0500 to 2200 |
| 17350 | 16468 | 0500 to 2200 |
| 22696 | 22000 | 0600 to 2100 |
| 22780 | 22084 | 0600 to 2100 |

If you prefer our VHF maritime band, it is

between 156.050 MHz and 162.025 MHz. Some channels are simplex (used by both stations), but others are duplex (each station transmits and receives respectively on the same pair of frequencies). If you want to hear all the dialogue you need to switch from one to the other frequency, or have them punched into your bank of memories.

| | |
|-----------------------------|------------------------------------|
| Search and rescue | 156.8 MHz |
| Ship to ship communications | 156.3, 156.4, 156.625, 156.675 MHz |

| | |
|-------------------------------|------------|
| French harbor communications: | |
| Pleasure harbors and marinas | 156.45 MHz |
| Fish or trade harbors | 156.60 MHz |
| Entrance of estuaries | 156.70 MHz |

The CROSS meteorological bulletins:

CROSS (Centres Régionaux Operationnels de Surveillance et de Sauvetage) is a military network of seaside stations positioned all along the French shore. Its main missions are: maritime traffic watching and regulation, and rescue coordination, with the support of French Navy, customs and other services.

CROSS stations transmit meteorological warning for open sea navigation. If bad weather is in progress, "Bulletins Météorologiques Spéciaux" (Special Meteorological Forecasts) are transmitted every hour at odd hour + 03 (Griz Nez), at even hour + 03 (Corsen), at even hour + 33 (Corsen). All these transmissions are preceded by a preliminary announcement made on 2182 kHz.

Meteorological Bulletins

| CROSS | Frequencies (kHz) |
|-------------------|-------------------------|
| Griz Nez (Manche) | 1650 (repeated on 2677) |
| Corsen* | 1650 (repeated on 2677) |
| Soulac** | 2677 |

Schedule
(local time)
0833 and 2033
0815 and 2015
0903, 1503 and 1903

*(northern Atlantic coast)

** (southern Atlantic coast)

For coastal navigation, two VHF channels (161.575 MHz, 161.625 MHz) and numerous schedules are used. But these forecasts are announced first on channel 16 (156.8 MHz). If necessary, there are also Special Meteorological Forecasts on these VHF channels, emitted as on HF at H + 03. The bulletins of Manche (English Channel) coastal stations are bilingual.

Don't forget that on LW you have the 198 kHz (BBC program 4 station) meteorological bulletins, too. They are available at 0048, 0535, 1201, and 1754 (local time).

If you prefer to decode Navtex transmissions, see table 1.



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All this maritime information is excerpted from the *Almanach du Marin Breton* (*Brittany Sailor Almanac*), 24 quai de la Douane, boîte postale 07, 29266 Brest cedex, France, e-mail: marin-breton@wanadoo.fr, with their permission. If you can read French, this annual book is crowded with navigational information (meteorology, lighthouses, currents and tides, astronomical data, etc.). Much of it is related to radiocommunications matters (radars, beacons, HF, VHF, UHF communications) for France, and more briefly, for bordering countries such as Belgium, Great Britain, and Spain.

Aeronautical

The VHF aeronautical band, of course, is between 108 MHz and 138 MHz. It is impossible to detail in this text all the frequencies used in the French airspace and its vicinities. Here are only some common frequencies to try.

You might think that the hottest frequency is 121.5 MHz – the worldwide civilian distress channel (123.1 MHz as backup). In fact, it is only used if it is impossible to contact a station on the usual frequencies in the zone under consideration. The military counterpart of 121.5 MHz is on 243 MHz.

Interesting channels with busier traffic include: gliders on 122.5 MHz, parachutists and balloons on 122.25 MHz, small aircraft from flying clubs on 123.5 MHz.

VOLMET bulletins are aired in French on 127.0 MHz (western France), 128.6 MHz (southern France), 125.15 MHz (Paris and northern France). The same bulletins in English are respectively on 126.4, 127.4, and 126 MHz. Paris Control is on 130.23 and 135.305 MHz.

In mountainous areas, paragliders and hang-gliders use information emitted by small automatic meteorological stations that give them some flight parameters. All these stations share the same nationwide NBFM VHF frequency (143.9875 MHz) and transmit on a recurrent sequential schedule a bit like NAVTEX. Yet contrary to it, the bulletins

are in a spoken form by the means of a voice synthesizer. The message includes: the name of the place where the station is located (generally the one of the corresponding mountain), the average and maximum wind speed and its direction, and the present temperature.

This information is useful not only for free flying buffs but to many others as well: mountaineers, gliders, hikers, bikers, walkers, amateur meteorologists, even wild life observers (to avoid scent detection by animals). It's especially important, as the weather in the mountainous regions of France, Switzerland (and other west European places) can change very quickly in the space of an hour, just as it does in mountainous regions of the US. Even in the height of summer, temperatures can fall 10°, 15° (centigrade) or more, the wind climbs quickly, and thundershowers or fog are possible. Glancing at the sky from time to time and listening to these VHF bulletins (in addition to the standard official weather forecast which you read before your day trip) is a good habit. Listening to VHF aeronautical local weather forecasts is another good source for changes in atmospheric conditions long before they affect your area.

Citizen band and radioamateurs

Citizens Band is between 26.965 and 27.405 MHz, in AM, FM or SSB mode. Channel 19 (27.185 MHz) is used by truckers, drivers, and the like as a calling frequency. Channel 27 was the former calling channel, but has fallen into disuse. If you want listen to SSB communications, try the specific calling channel 17 (27.165 MHz). Do not forget that CB frequencies are not regulated, so consider these indications as they are: simple suggestions.

You'll also find many out-of-band CB communications (below 26.965 MHz and above 27.405 MHz, up to and well into the 28 MHz amateur band) from nonstandard CB transceivers or modified amateur gear. Prohibited modes in CB band, such as CW or packet, are possible, in or out of the legal CB frequencies.

The radio amateur frequencies assigned in France for the HF spectrum



are as follows:

| | |
|--------------------|------------------------|
| 1830 to 1850 kHz | 18068 to 18168 kHz |
| 3500 to 3800 kHz | 21000 kHz to 21450 kHz |
| 7000 to 7100 kHz | 24890 to 24990 kHz |
| 10100 to 10150 kHz | 28000 kHz to 29700 kHz |
| 14000 to 14350 kHz | |

VHF and UHF allocations for French radio hams are:

50.2 to 51.2 MHz
144 to 146 MHz
430 to 440 MHz
1240 to 1300 MHz

All these frequencies are not entirely reserved to the radioamateurs with an exclusive status. Some are exclusive, some are with a priority level, others are on an equal footing with different services, and others are in a secondary or even lower status.

A bilateral agreement between American and French Nations permits citizens of these two countries to send and receive amateur transmissions during their presence in the other one. You must, however, ask for a special temporary license. There is more on this subject at the ARRL information department (or at <http://www.arrl.org>).

Like with the CB, out of allotted amateur bands transmissions are common in Europe, with SSB, RTTY, CW, ARQ, SSTV and other modulations being used. Some frequency ranges seem particularly popular, such as around 3.4 MHz, 6.6 MHz (Echo Charlie Band), 13.9 MHz, 25.26 MHz.

We also have pirate stations, both in the MW band and just above its upper limit, between 3.9 MHz and 4 MHz, and near 7 MHz.

I hope you will enjoy your journey in my country (with and without your electronic companion). Another time I may bring you a more detailed view of the VHF-UHF French radio-communications spectrum if readers express an interest. *Bon voyage!*



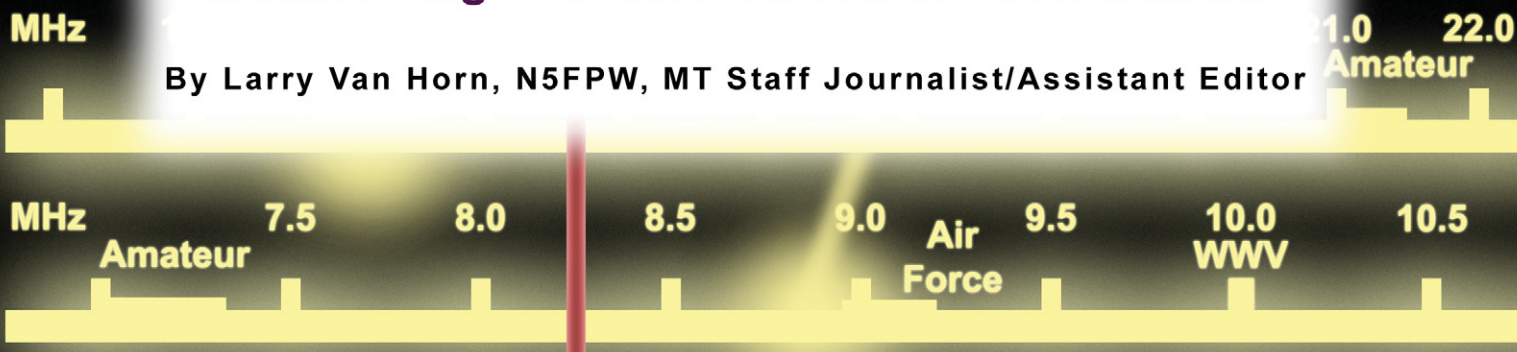
Table 1: NAVTEX Broadcasts

| Identification | Frequency | Language | Special Meteorological Forecasts (UTC) | Normal Schedule (UTC) |
|-------------------|-----------|----------|---|-----------------------|
| "A" International | 518 kHz | English | Each 4th hour, 0000 and starting at 0000 | 1200 |
| "E" National | 490 kHz | French | Each 4th hour, 0840 and starting at 00H40 | 2040 |



Who's Who in the Radio Spectrum (Part 4) Monitoring the Shortwave Action Bands

By Larry Van Horn, N5FPW, MT Staff Journalist/Assistant Editor



From time to time I hear radio hobbyists lament that the “shortwave radio bands are dead or dying.” And every time I hear them grumbling my answer is very simple: “That just is not the case. Shortwave is very much alive and well, thank you!”

For the last several decades I have been watching the major players in the shortwave spectrum vigorously defend their HF assignments at the International Telecommunications Union (ITU) World Administrative Radio Conferences (WARC). The death of shortwave could not be farther from the truth.

The loudest cry I hear comes from the shortwave broadcast listening community. They are totally convinced the medium is dying and soon there won't be a shortwave broadcaster or service left to hear. But that myth doesn't hold with reality when we look at it from the legislative action that has been passed at recent international radio conferences. The broadcasters continue to fight for even more shortwave spectrum. In fact, over the last couple of decades we have seen a 46 percent increase in the total spectrum allocated to shortwave broadcasters. Since the broadcasters are the ones who request and lobby for that additional spectrum, it doesn't sound to me like they plan to abandon the shortwave spectrum in the near future.

Even so, when we break down the various shortwave service assignments, we see that the largest user of the shortwave spectrum isn't the broadcast or ham community. It is the nonbroadcast services (see Table 1) who dominate the shortwave spectrum charts.

In recent years we have seen a major renaissance in the world of nonbroadcast shortwave radio listening. A few years ago, we saw predictions that satellites would pull everyone off the shortwave bands. While some services have shifted significant portions of their traffic to satellites – maritime voice communications being the most notable – other new services

come online almost daily to take their place in the shortwave action bands.

The lure of listening to these action bands – monitoring ships at sea, commercial airliners over open ocean, or military and government communications, to name just a few – is totally irresistible to most radio hobbyists. With the majority of the shortwave spectrum devoted to these types of communications services, it is little wonder that eventually even the most stalwart of amateur radio operators and shortwave broadcast listeners occasionally tune across the shortwave action bands.

Utility monitoring

(And we're not talking about listening to the power company!) Anyone who has tuned across the shortwave spectrum from 1.7 to 30 MHz in the AM mode cannot help but notice the plethora of strange noises coming from their receiver's speaker. Switch your receiver mode to upper sideband, and you will uncover an even stranger hidden world of exotic beeps, buzzes, roars and whirls, as well as non-AM/FM voices modes (both in the clear and scrambled). These and other types of communications are all part of what is commonly known in the hobby as the “utility” scene.

By definition, a “utility” transmission is a radio signal that is neither a broadcast program nor an amateur radio or citizen band transmission. Unlike those services, utility communications are intended more as private communications than for general public consumption.

Although usually found outside the established shortwave broadcast and amateur bands, utility transmissions can and do pop up anywhere in the high frequency (HF) radio spectrum. Table 2 gives an in-depth view of the entire HF utility spectrum.

Why do we listen?

Why would anyone want to listen to utility

transmissions? One of the big reasons is variety. There are literally thousands upon thousands of different stations transmitting in the utility (ute) bands.

You will hear mobile stations such as ships and aircraft. There are fixed stations from foreign embassies, military bases, government agencies, and commercial companies, to name a few, transmitting in the HF spectrum.

Many stations transmit from exotic locations broadcast listeners would consider rare DX. When was the last time you caught a shortwave broadcaster from Amsterdam and Saint Paul, Martinique, or Western Samoa?

Of course, there are disadvantages to “ute” monitoring. If you are not equipped with the latest digital decoder, you will miss out on over half of the signals you can hear in these bands (see section below).

Compared with broadcast stations, utility stations use relatively low power; thus are weaker when received. And you won't find many that have published schedules, so monitoring requires persistence and a bit of luck.

To be a *successful* utility monitor, a good tabletop, general coverage shortwave receiver with sideband capability is a “must.” As a general rule, shortwave portables and wideband handheld radios do not have enough sensitivity and selectivity to effectively monitor the utility radio spectrum. For an antenna, a wire dipole or longwire antenna is preferred, since most utility communications cover almost the entire shortwave spectrum.

Since “ute” transmissions can occur at anytime, hearing them is just a matter of where to tune and hopefully getting the propagation necessary to intercept the signal. One trick that Patrick O'Connor in his *Who's on First* series in *MT* back in the 1980s suggested, was to check out the shortwave broadcast band nearest where you want to DX. The foreign signals will give you an idea of where utility transmissions may

be coming from. I also use the ham bands and some of the amateur radio beacons as propagation indicators (more on beacons in the next issue of *MT*).

Generally speaking, the higher frequencies (those above 10 MHz) are better during your local daylight hours, while the frequencies below 10 MHz are better during dark hours.

The lower frequencies also tend to be better in the winter months, with the higher frequencies better during the summer. With the present high sunspot count, the higher frequencies (especially those above 15 MHz) are propagating well during daylight hours. That has eased congestion on the lower frequencies. But, this situation will change as soon as we start our downward slide toward sunspot count minimum in about seven years.

Digital Modes Abound

As mentioned above, the most common transmission modes in the "ute" bands are the non-voice or digital modes. As in the rest of the technological world, the advances we have seen in the digital monitoring field over the last decade have been nothing short of astounding.

Tune around the bands today using an older digital decoder, looking for the old standbys like CW (Morse code), facsimile, and radioteletype (RTTY), and you will largely be disappointed due to the infrequent use of those modes.

Older digital decoders, such as the Universal M400, M6000 and M7000 units are long past their prime when it comes to monitoring in today's digital environment. You will still find the occasional Morse code (mostly amateurs), RTTY Baudot (most are encrypted or amateur), SITOR-A/B (some in marine bands), VFT (all but disappeared), ARQ-E/E3/M2/M4 (best heard overseas), packet (being replaced by PSK31), and facsimile (moving to either satellite or the internet), but most of these modes have given way to newer, more efficient (and exotic) modes in the HF spectrum.

Today's HF digital monitor has available to him some of the most sophisticated tools ever created for the hobbyist. Old names such as Info Tech, HAL and AEA have given way to the new breed of computer-based decoders from Hoka, Wavecom and several others.

Older modes such as VFT and CW are out and have been replaced with new buzz words

like ALE, Clover and PSK31. To get a better idea what is going on, see Mike Chace's *Digital Digest* column in *MT*, especially the July 2001 issue, page 35.

Some Voice Targets on HF

Some of the easiest signals to hear in the utility bands are aeronautical communications. In Table 2 you will see listings for aeronautical mobile, routed and off route communications. Most communications revolve around the flight progress of each aircraft (civilian and military) flying over open ocean areas and over third world nations. You will find the bulk of the activity in the routed aero segments.

If it is military aircraft communications you want to monitor, then you should be tuning through the off route segments of the aero bands. The off route segments support the bulk of military air-to-ground communications for many nations around the world.

Aeronautical communication is only a tip of the of the utility world iceberg. In the maritime bands you will find some ship voice traffic, though nowhere near what we heard 10 years ago. This is the one segment of the shortwave spectrum which has made a major shift from HF to satellites. Years ago we could tune through the duplex radiotelephone portion of the marine bands day or night and hear all the major cruise ships running phone patches. With the shift to satellite, most of the big shore stations that supported phone traffic have shut down, and these bands are pretty quiet except for some overseas traffic.

If you want to monitor ship traffic these days, the marine simplex ship frequencies offer the listener the best opportunity. Tune to the following frequencies in upper sideband (USB) to catch some of the action: 4125 4146 4149 4417 6215 6224 6227 6230 6516 8219 8294 8297 12290 12353 12356 12359 16420 16528 16531 16534 22159 22162 22165 22168 22171 kHz.

There are other things to hear in the utility spectrum. This includes various government agencies (both U.S. and foreign), all branches of the military (including foreign military), law enforcement agencies (DEA, FBI, Customs, and foreign agencies), commercial operations, time signals, and the list goes on. Its impossible to cover or do justice to all the activity you will hear in the utility action bands in an introductory article such as this. So further reading and study is advised. But it is the variety of possible intercept targets that keeps most of us tuning these bands. You just never know who you're going to hear next.

You can find out more about this exciting portion of the radio hobby by reading our monthly *Utility World* and *Digital Digest* columns right here in the pages of *Monitoring Times*.

You will also find in-depth coverage on the World Util-



photo credit : Harry Baughn

ity News website: <http://www.wunclub.com>. *MT Ute World* columnist Hugh Stegman (<http://www.ominous-valve.com/uteworld.html>) and *Digital Digest* columnist Mike Chace (<http://www.chace-ortiz.org/umc/>) have excellent websites to aid the utility band listener.

Utility listening can be fun and challenging. And one thing's for sure – you won't run out of stations to listen to as you tune through the shortwave action bands.

Table 1: Shortwave Spectrum Occupancy

| |
|--------------------------------------|
| Citizen Band Radio (U.S. only) |
| 440 kHz |
| Amateur Radio Bands |
| 3.750 MHz See note 2 |
| Shortwave Broadcast Services |
| 5.735 MHz See notes 2, 3, 4, 5 and 6 |
| Non-Broadcast Services |
| 21.48 MHz |

Notes:

1. Total frequency figures above for each service includes shared spectrum.
2. With the assignment in note 4 and the 200 kHz shared assignment at 7 MHz, amateur radio operators and shortwave broadcasters share 300 kHz of the HF spectrum.
3. Shortwave broadcasters currently have 2.930 MHz of the HF spectrum from 1.7-30 MHz assigned exclusively to broadcasting.
4. The WARC-92 ITU conference gives shortwave broadcasters another 790 kHz of spectrum they now share as an exclusive assignment beginning in 2007, giving them a total of 3.720 MHz of exclusive assignment.
5. Shortwave broadcasters currently have 1.005 MHz of spectrum they share with various services in the HF spectrum on a non-interference basis.
6. Tropical band broadcasting has 810 kHz of shared assignment for broadcasters (100 kHz is shared with amateur radio).



photo credit: Bob Grove

Table Two: HF Non-Broadcast Service Allocations

| Freq Range(kHz) | ITU Region | Service(s) | | | | | | |
|-----------------|-------------|--|-----------|-------------|---|-------------|-------------|---|
| 1705-1800 | Region 1 | Maritime Mobile + Fixed/Mobile | 2850-3025 | All Regions | Aeronautical Mobile (Routed) | 11600-11650 | All Regions | Fixed (shared with broadcasters) |
| | Region 2 | Aero Radio Navigation + Fixed/Mobile | 3025-3155 | All Regions | Aeronautical Mobile (Off Route) | 12050-12100 | All Regions | Fixed (shared with broadcasters) |
| | | | 3155-3200 | All Regions | Fixed/Mobile | 12100-12230 | All Regions | Fixed |
| | Region 3 | Fixed/Mobile + Radiolocation/Navigation | 3200-3400 | All Regions | Fixed/Mobile (shared with broadcasters) | 12230-13200 | All Regions | Maritime Mobile |
| 1810-1850 | Region 3 | Fixed/Mobile + Radiolocation/Navigation (Shared with Amateurs) | 3400-3500 | All Regions | Aeronautical Mobile (Routed) | 13200-13260 | All Regions | Aeronautical Mobile (Off Route) |
| | | | 3500-3750 | Region 1/3 | Fixed/Mobile (shared with amateur radio) | 13260-13360 | All Regions | Aeronautical Mobile (Routed) |
| | | | | Region 2 | Amateur Radio | 13360-13410 | All Regions | Fixed + Radio Astronomy |
| 1850-2000 | Region 1 | Fixed/Mobile | 3750-3800 | All Regions | Fixed/Mobile (shared with amateur radio) | 13410-13570 | All Regions | Fixed/Mobile |
| | Region 2/3 | Fixed/Mobile + Radiolocation/Navigation (Shared with Amateurs) | 3800-3900 | Region 1 | Aeronautical Mobile (Off Route) + Fixed/Mobile | 13570-13600 | All Regions | Fixed (shared with broadcasters) |
| | | | | Region 2/3 | Fixed/Mobile (shared with amateur radio) | 13800-13870 | All Regions | Fixed (shared with broadcasters) |
| 2000-2045 | All Regions | Fixed/Mobile | 3900-3950 | Region 1 | Aeronautical Mobile (Off Route) | 13870-14000 | All Regions | Fixed/Mobile |
| 2045-2065 | Region 1 | Maritime Mobile + Fixed/Mobile | | Region 2 | Fixed/Mobile (shared with amateur radio) | 14350-14990 | All Regions | Fixed/Mobile |
| 2065-2107 | Region 1 | Maritime Mobile + Fixed/Mobile | | | | 14990-15010 | All Regions | Standard Frequency and Time Signal |
| | Region 2/3 | Maritime Mobile | | Region 3 | Aeronautical Mobile (shared with broadcasting) | 15010-15100 | All Regions | Aeronautical Mobile (Off Route) |
| 2107-2160 | Region 1 | Maritime Mobile + Fixed/Mobile | | | Fixed (shared with broadcasting) | 15600-15800 | All Regions | Fixed (shared with broadcasters) |
| | Region 2/3 | Fixed/Mobile | 3950-4000 | Region 1/3 | Fixed/Mobile (shared with amateur radio) | 15800-16360 | All Regions | Fixed |
| 2160-2170 | Region 1 | Radiolocation | | Region 2 | Fixed + Maritime Mobile | 16360-17410 | All Regions | Maritime Mobile |
| | Region 2/3 | Fixed/Mobile | | | Maritime Mobile | 17410-17480 | All Regions | Fixed |
| 2170-2173.5 | All Regions | Maritime Mobile | 4000-4063 | All Regions | Fixed/Mobile | 17480-17550 | All Regions | Fixed (shared with broadcasters) |
| 2173.5-2190.5 | All Regions | Mobile (Distress and Calling) | 4063-4438 | All Regions | Aeronautical Mobile (Routed) | 17900-17970 | All Regions | Aeronautical Mobile (Routed) |
| 2190.5-2194 | All Regions | Maritime Mobile | 4438-4650 | All Regions | Aeronautical Mobile (Off Route) | 17970-18030 | All Regions | Aeronautical Mobile (Off Route) |
| 2194.0-2300 | All Regions | Fixed/Mobile | 4650-4700 | All Regions | Aeronautical Mobile (Off Route) | 18030-18068 | All Regions | Fixed |
| 2300-2495 | All Regions | Fixed/Mobile (shared with broadcasters) | 4700-4750 | All Regions | Aeronautical Mobile (Off Route) + Fixed/Mobile (shared with broadcasting) | 18168-18780 | All Regions | Fixed/Mobile |
| 2495-2498 | Region 1 | Fixed/Mobile (shared with broadcasters) | 4750-4850 | Region 1 | Fixed/Mobile (shared with broadcasting) | 18780-18900 | All Regions | Maritime Mobile |
| | Region 2/3 | Standard Frequency and Time Signal | | Region 2/3 | Fixed/Mobile (shared with broadcasting) | 18900-19020 | All Regions | Fixed (shared with broadcasters) |
| 2498-2502 | All Regions | Standard Frequency and Time Signal | 4850-4995 | All Regions | Fixed/Mobile (shared with broadcasting) | 19020-19680 | All Regions | Fixed |
| 2502-2505 | Region 1 | Fixed/Mobile | 4995-5005 | All Regions | Standard Frequency and Time Signal | 19680-19800 | All Regions | Maritime Mobile |
| | Region 2/3 | Standard Frequency and Time Signal | 5005-5060 | All Regions | Fixed (shared with broadcasting) | 19800-19990 | All Regions | Fixed |
| 2505-2625 | All Regions | Fixed/Mobile | 5060-5450 | All Regions | Fixed/Mobile | 19990-20010 | All Regions | Standard Frequency and Time Signal |
| 2625-2650 | Region 1 | Maritime Mobile/Radio Navigation | 5450-5480 | Region 1/3 | Aeronautical Mobile (Off Route) + Fixed/Mobile | 20010-21000 | All Regions | Fixed/Mobile |
| | Region 2/3 | Fixed/Mobile | | Region 2 | Aeronautical Mobile | 21850-21870 | All Regions | Fixed |
| 2650-2850 | All Regions | Fixed/Mobile | | | Aeronautical Mobile (Routed) | 21870-21924 | All Regions | Aeronautical Fixed |
| | | | 5480-5680 | All Regions | Aeronautical Mobile (Off Route) | 21924-22000 | All Regions | Aeronautical Mobile (Routed) |
| | | | 5680-5730 | All Regions | Fixed/Mobile | 22000-22855 | All Regions | Maritime Mobile |
| | | | 5730-5900 | All Regions | Fixed/Mobile (shared with broadcasting) | 22855-23000 | All Regions | Fixed |
| | | | 5900-5950 | All Regions | Maritime Mobile | 23000-23200 | All Regions | Fixed/Mobile |
| | | | | | Aeronautical Mobile (Routed) | 23200-23350 | All Regions | Aeronautical Fixed + Aeronautical (Off Route) |
| | | | 6200-6525 | All Regions | Aeronautical Mobile (Off Route) | | | |
| | | | 6525-6685 | All Regions | Fixed/Mobile | 23350-24890 | All Regions | Fixed/Mobile |
| | | | 6685-6765 | All Regions | Fixed/Mobile (shared with broadcasting) | 24990-25010 | All Regions | Standard Frequency and Time Signal |
| | | | 6765-7000 | All Regions | Maritime Mobile | | | |
| | | | 7300-7350 | All Regions | Aeronautical Mobile (Routed) | 25010-25070 | All Regions | Fixed/Mobile |
| | | | | | Aeronautical Mobile (Off Route) | 25070-25210 | All Regions | Maritime Mobile |
| | | | | | Fixed/Mobile | 25210-25550 | All Regions | Fixed/Mobile |
| | | | | | Fixed/Mobile (shared with broadcasting) | 25550-25670 | All Regions | Radio Astronomy |
| | | | | | Maritime Mobile | 26100-26175 | All Regions | Maritime Mobile |
| | | | | | Aeronautical Mobile (Routed) | 26175-28000 | All Regions | Fixed/Mobile |
| | | | | | Aeronautical Mobile (Off Route) | 29700-30000 | All Regions | Fixed/Mobile |
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| | | | | | Fixed/Mobile (shared with broadcasting) | | | |
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Photo credit: Charles Bown

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Kevin Carey

P.O. Box 56, W. Bloomfield, NY 14585

The Steve Anderson/Patriot Radio Story

By Hans Johnson

Even with a Chinese-made SKS assault rifle in every room of his rural Kentucky home, Steve Anderson felt threatened. But though he was a crack shot, he was nowhere near as accurate with a radio microphone.

Steve Anderson's brief flame flared up in the spring of 2001. Like a large wildland fire, this militiaman extinguished himself by the fall of the same year – but not without burning those who came too close. Lashing out against the Feds and Jews, his greatest victims turned out to be neither.

The Smoldering Fire

Amateur shortwave radio served as Anderson's first venue for venting. His racist and anti-Semitic comments as licensed ham AA8DP made him *persona non grata* even at right-wing forums such as the Liberty Net. He then drifted from ham net to net without satisfaction. In the summer of 2000, Anderson joined the Kentucky State Militia (KSM).

As a shortwave listener, he frequently called in to Mark Koernke's *Intelligence Report* program. Better known as "Mark from Michigan," Koernke first achieved notoriety in the aftermath of the Oklahoma City bombing. With his many appearances, Anderson came to the attention of the Anti-Defamation League (ADL). As a watchdog group dedicated to combating anti-Semitism, the ADL regularly monitored militia-oriented programs such as Koernke's. Shortwave station WWFV (then WGTG) of McCaysville, Georgia, served as Koernke's primary outlet.

Koernke's supporters had accused WWFV of preempting and selectively editing the *Intelligence Report*. They also believed that WWFV was removing "patriot" programming from the station's schedule without reason. Things got nasty in December 2000 when WWFV inter-

rupted Koernke's broadcast with a program produced by the station's owner. A man's voice suddenly started interference [jamming] with the WWFV program on 6890 kHz. The voice said, "Dave Frantz, you're a gutless liar... we are the Kentucky State Militia, we don't need you anymore, Dave Frantz... we have our own shortwave transmitter...there's no support for you, Dave, you're aliar," etc. The jamming continued sporadically for several days.

Riley Hollingsworth, the Amateur Radio Special Counsel of the Federal Communications Commission's Enforcement Bureau, believed it was Anderson who had interfered with WWFV. Given Anderson's past amateur radio activities, Hollingsworth recognized his voice. The Federal Communications Commission's (FCC) direction finding network also gave Hollingsworth a pretty good idea of the jammer's location.

Others drew the same conclusion. The KSM received an email congratulating Anderson on his successful jamming of WWFV. Charlie Puckett, then commander of the KSM, denied that Anderson interfered with WWFV, claiming it was others who knew of Anderson's

pending radio operation. Patrick Perry, Communications Officer for the 9th Battalion of the KSM, disagrees and identifies Anderson as the jammer. "No one else had the capability," he explains.

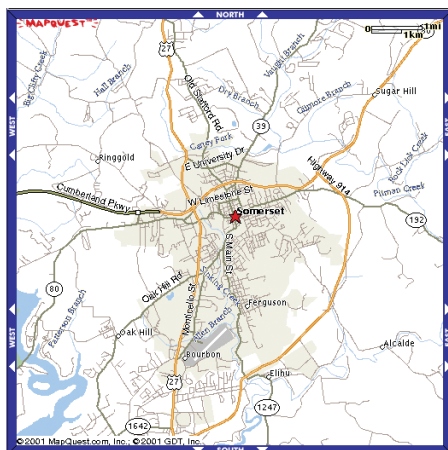
The jamming episode cast neither Anderson nor Puckett in a favorable light. Anderson had performed an illegal act in the name of the KSM. Although he would later wrap himself in the cloak of freedom of speech, Anderson had no qualms in trying to strip it away from others. Puckett's failure to condemn the jamming seemed to indicate that he condoned it.

Hollingsworth sent Anderson a letter warning him about the jamming. Hollingsworth also asked Anderson for details of alleged amateur radio violations he had committed around the same time. Anderson's ultimate response was to surrender his amateur radio license. He asserted that as a sovereign citizen the FCC had no authority over him.

Out of Control

Steve Anderson moved from jammer to outright broadcaster in March 2001. With the slogan, "Your First Amendment station, protected by the Second Amendment," Anderson, identified as Major Steve Anderson, 6th Battalion Commanding Officer for the KSM, began regular shortwave broadcasts on 3260 kHz as Kentucky State Militia Radio (KSMR). His initial broadcasts informed listeners of the station's status and provided contact information for a number of militias across the country. He had no license or approval from the FCC for his station.

Extreme organization and tidiness characterized Anderson's basement radio room. That certainly couldn't be said about the rest of the place, which featured junk cars in the yard and bare plywood floors inside. A copper wire cage shielded KSMR's transmitter from electronic in-



terference and likewise protected computer equipment from interference from the transmitter. Tapes of his shows and other programs were organized on one wall and ammunition was stored nearby. Another wall soon displayed FCC warning letters and newspaper articles written about the station.

KSMR initially received support from a number of sources. Koernke donated some items, and militias in both Michigan and Ohio also helped. Since Anderson didn't have an email address, Koernke supplied his for listeners to send in their signal reports. Others provided satellite receivers and fixed the transmitter when it needed repairs.

KSMR did what no unlicensed American shortwave broadcaster had ever done. Anderson vowed to protect KSMR through force of arms if the government attempted to shut the station down. His March 6th broadcast comments were typical: "Say something catastrophic might happen. Like lots of bodies piled in my front yard, uh, due to lead poisoning . . . But they'd be inside the fence. He, he. Don't even think about it."

The FCC's Hollingsworth quickly countered with the statement, "There will be an enforcement action." Generally the FCC sends out warning letters as a first step in dealing with pirate broadcasters. Such letters are cost effective and often convince the operator to cease his broadcasts. Hollingsworth's comment seemed to imply something stronger than a letter was planned.

Anderson viewed it as just another letter and made a mockery of it. "(There is) no point in citing me," he stated. "This is not my station. This is the Kentucky Militia station... We don't want to hear from you (because) you don't have anything to say to us. You don't have any authority over us. We are asserting our First Amendment Rights here and are protecting them with the Second Amendment."

The FCC couldn't do anything directly. With no armed agents of its own, the Commission had traditionally relied on local and/or federal law enforcement to accompany them in raiding any station. The Commission did record all of Anderson's broadcasts and continued to send him warning letters.

While some may wish that the FCC had quickly raided KSMR, there is nothing to suggest that the Commission dragged its feet in dealing with the station. Anderson only transmitted seven months. Pirates that defy the FCC can take years to completely shut down. La Voz de Alpha 66, a Cuban-American shortwave station in south Florida, lasted several years by first ignoring and then eluding the FCC.

The KSM Gets Burned

So why did Anderson start KSMR? Plain

and simple, he wanted to support Mark Koernke. The *Intelligence Report* wouldn't face preemption or editing on KSMR. By extension, KSMR could serve as a broadcast outlet for other militia-oriented programs. Anderson also wanted to give the militia movement a voice, because they couldn't afford to purchase airtime. And, a militia station could also provide critical communications in a national emergency.

Anderson initially floated his idea for a shortwave station at a multi-state militia meeting in Millerstown, Kentucky, in October of 2000. "Most [militia] members thought that this was to be a commercial station licensed through the FCC," explains Perry. "Members had no reason to believe that this station would be otherwise," he adds. The idea generated a lot of excitement and was met with enthusiasm.

especially worried about KSMR's pirate status, most were. The largest concern seems to have been Koernke's involvement. Charlie Puckett reassured them that KSMR [was] "owned and operated by KSM as a whole."

Puckett's reassurances were completely blown out of the water by Anderson's March 12th broadcast. Anderson stated that those not worshipping Jesus should leave the United States. He also identified himself as a believer in Christian Identity, a theology known for its anti-Semitism.

Anderson was simply too much of a loose cannon for the 9th Battalion of the KSM to handle. Under pressure from Perry and Jesse Horn, the 9th Battalion Commander, Puckett ordered Anderson off the air on March 20th. Anderson simply changed his moniker to United Patriot Radio (UPR) and resumed broadcasting on March 23rd on 6900 kHz.


Facing expulsion from the KSM, Anderson promised at the Norm Creek militia meeting in early April to shut down the UPR and return donations. Anderson then apparently quickly changed his mind. Rather than giving back the donations, he started soliciting them again while the Norm Creek meeting was still going on.

Puckett expelled Anderson from the KSM on April 10th for failing to obey his orders. UPR continued on the air. Anderson now claimed to be with the Kentucky Riflemen Militia, a much smaller and more secretive militia than the KSM.

Puckett's dealings with Anderson remained ambivalent. He continued to use UPR as a vehicle for disseminating KSM alerts and news. Puckett was also Anderson's guest on the station a few times. As the KSM commander, his actions left the impression that the KSM tacitly supported UPR, and by extension, agreed with Anderson's anti-Semitic statements.

Anderson's dedication, knowledge, and drive put KSMR/UPR on the air. Although it was a pressure cooker of his own making, he kept the station on the air over seven months under great stress. He had created a powerful tool. Programs and announcements could be put on the air for a fraction of the cost of a commercially licensed station. KSMR/UPR did not have to answer to WWFV, other commercial stations, or the FCC. Publicly defying the Federal government on nearly a daily basis was just the icing on the cake.

Anderson threw all this away in order to air his anti-Semitic views and general threats. He knew that most in the KSM neither approved of what he was saying nor could they simply ignore it. Such views were also hurting relations between the Kentucky State Militia and the militia movement the station was supposed to be



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Wanted by the Kentucky State Police and the
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\$20,000

is being offered by ATF for information leading to the
arrest of

STEPHEN HOWARD ANDERSON
(also known as Steve Anderson)



DESCRIPTION

| | |
|----------------|----------------|
| Date of Birth: | July 16, 1947 |
| Height: | 6'2" |
| Weight: | 235 pounds |
| Eyes: | Green |
| Hair: | Dark/Short |
| Aliases: | Steve Anderson |

- **Anderson is wanted by the Kentucky State Police for Attempted Murder.**
- **Anderson is wanted by ATF for violations of Federal explosives laws.**

KSMR gave every impression of being the official KSM station, fully sanctioned and supported by the KSM. The operator was a KSM officer running the station from his home. Then there was the station identification – Kentucky State Militia Radio. Anderson also made statements such as: "The opinions expressed on this program reflect the views of the hosts and the guests on the program and are not necessarily those of the Kentucky State Militia. But don't bet on it."

Internally, there were questions and doubts. Although they knew of Anderson's plans, there was surprise that the station had come on the air so quickly. Although some in the KSM were not

promoting. The North Carolina Citizens Militia was the most articulate. Initially it suggested that its members tune in the station. After hearing Anderson's bombasts, they apologized and wrote that "While UAP [sic] programming reflects many legitimate perspectives of the unorganized militia, taken as a whole, it remains a liability to the patriot community. We reject the premise that we must tolerate the tyranny of religious or cultural bigotry to qualify for the fight against government tyranny." Yet Anderson took any suggestion that he keep his views and threats to himself as "censorship" and interference with his freedom of speech.

The 9th Battalion simply could not accept Puckett's continued support of Anderson and UPR. Puckett would not abandon what he saw as a vital communications tool. The fallout from the impasse resulted in Puckett's resignation as commander of the KSM and the 9th Battalion distancing itself from the KSM.

Back-Fire

Anderson settled into a routine by summertime. He aired his own program, along with the *Militia Hour* and programs from Christian Identity ministers. The best known was James Wickstrom, a leader in Posse Comitatus, an anti-government survivalist group. Anderson established a website on a Posse Comitatus page (now defunct), giving his schedule along with a mission statement urging "death to the satanic seed line and their Jew world order."

The *Somerset Commonwealth Journal* had written a few pieces about Anderson. The newspaper's news editor, Carol Coffey, wrote a piece in August reporting that the FRRR had described Anderson as the "#1 hate speech broadcaster in America."

This piece really set Anderson off: "Uh, the local paper is, uh, continuing to, uh, comment to try and get me raided. Basically because the newspaper, that, uh, what's her name, Coffey, she's a Jew, and she doesn't like the Identity shows. Well, gee, I'm sorry. You know, then don't listen. Uh, and if we're raided and they don't kill me and I get out of here, guess who I'm going to go see first? Ha Ha Ha, yeah, Hi! Honey, I'm home. Oh, well, I got a big hug and a kiss for you. Uh, yeah, hi baby, [now] one of those articles that got [boots] the [jack booted thugs] hit on my property, they blew my house up, oh, I got something for you honey, ha ha ha."

Once again Anderson's freedom of speech didn't include freedom of speech for others. First Anderson had jammed WWFV to stifle a voice he disagreed with; now he was threatening a newspaper editor because he didn't like what



Picture of Carol Coffey from Louisville *Courier-Journal*, by Stewart Bowman

she wrote about him.

The ADL notified Coffey she had been threatened and provided her with a tape of Anderson's threat. Coffey says she shrugged it off at first, as she is often threatened and isn't even Jewish. But after speaking with her husband and Jeff Neal, the paper's editor, they decided to contact the FBI. The FBI explained that they couldn't do anything about Anderson's threat. While the FBI was aware of Anderson, "It didn't appear to me that they were trying to build any sort of case at all," Coffey says.

Nor was the FCC any help. They wouldn't even return Coffey's calls.

Coffey finally took it up with the local county sheriff, Sam Catron. "He was quite concerned," she explained. "I think he took it more seriously than any other law enforcement did," Coffey adds. Coffey was told to be more careful, but nothing happened to Steve Anderson. "From some law enforcement, I have heard that they were waiting for him to commit a felony," she explains.

Anderson Flames Out

UPR continued on until October. On October 14th, Anderson was driving through the Kentucky town of Middleboro in Bell County when someone called 9-1-1 and reported that Anderson was driving erratically. A deputy sheriff pulled Anderson over for a broken tail light. The deputy was about to send Anderson on his way when he noticed ammunition clips on the seat next to Anderson. The deputy asked Anderson if he had weapons in the car and Anderson replied that he had several.

Anderson then reportedly shot up the deputy's car as he retreated behind it. Anderson next drove into nearby hills and ran off on foot. He has eluded authorities ever since. Anderson is now wanted by the Kentucky State Police for attempted murder and by the Federal Bureau of Alcohol, Tobacco, and Firearms for explosives violations.

How does a 54-year old man disappear on foot over 100 miles from his home without a trace?

"He's literally disappeared off the face of the planet," explains Coffey. "He's disappeared from a town he didn't live in. A town that he probably had limited connections in," she adds.

Some law enforcement people have told Coffey that Anderson is being aided by friends, but she wonders how Anderson is contacting these friends. "It genuinely seems like there's not being a real effort at this point to find him," she explains. Unsatisfied with law enforcement, the *Somerset Commonwealth Journal* has prepared a package on Anderson and mailed it to the *America's Most Wanted* television show.

Carol Coffey has four small children under the age of 10. "Steve Anderson can have his opinions about anything he wants to have, he really can. But he has caused two of my children to have some really bad experiences because they are afraid every time mommy goes to work," she explains. "My daughter has had to go into counseling, because she was scared to death that this man was going to kill me," Coffey adds.

Such is the legacy of Steve Anderson. His greatest victims weren't the Feds or Jews. They were children.

Some Thoughts on Looking Back

Anderson sacrificed a lot on the altar of anti-Semitism. Certainly he was not alone in expressing anti-Semitism on shortwave; there were and are others. But, his Anti-Semitism drew the attention of the ADL and other watchdog groups such as the Far Right Radio Review (FRRR). These groups had their recorders running each time Anderson issued a threat or made an anti-Semitic comment.

Kentucky newspapers, the primary outlets for general media coverage of Anderson, didn't monitor his broadcasts and weren't particularly familiar with shortwave. Rather, they relied upon the watchdog groups for perspective, coverage, and quotes, all of which were readily shared. Anderson quickly got himself tagged as a hate speech broadcaster. Instead of trying to defend freedom of speech, Anderson and others in the KSM refused to talk with what they characterized as "the mainstream media."

Telling the world how much he hated the Feds and Jews overshadowed everything. Without them, Anderson would never have drawn so much negative publicity and scared off many potential supporters. As a mere pirate broadcaster simply passing along militia news and contact information, he would have had a much better chance at framing the debate as freedom of speech. Some in the KSM and other militias would surely have supported such a stance.

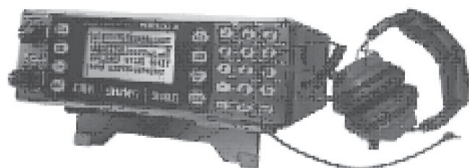
As it was, Anderson thoroughly disrupted and divided the loose KSM coalition within just a matter of months. Some hold the view that anyone so disruptive must have been a government plant.

If so, the KSM made it fairly easy for him. Anderson was invited into the KSM. The KSM blessed his idea of a shortwave radio station. Puckett resigned rather than severing ties to the radio station and Anderson. This wasn't the work of the Federal government: The KSM, and the KSM alone, made the mistakes of accepting Anderson into their ranks, then endorsing a major undertaking they didn't understand or examine. They also lacked a commander who would quickly and effectively deal with a major problem.

Without a doubt, most in the KSM did not approve of Anderson's actions, but the damage was done. He had already acted in their name, and that's what many will remember ... if they remember him at all.

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"Killer" Antenna for Low Band DXing

This month's column was prompted by a note from *MT* reader Dave Palitsch after having built the *Grove Tunerless All-Band* antenna previously described in the October '00 issue of this column. He writes:

"...The 'Grove Tunerless' continues to perform exceptionally well. I am really looking forward to the winter DX season!...Can you recommend a 'killer antenna' for the lower bands...?"

This One's for You

It's ironic that for all the recent advances in modern radio reception we have to go back 80 years to find the granddad of all low band "killer" antennas. In the November 1922 issue of *QST*, H. H. Beverage wrote about what he called "A Wave Antenna for 200-Meter Reception." A scant 60 years later in the January '82 issue of *QST* Doug DeMaw updated the piece with an article entitled "The Classic Beverage Antenna, Revisited."

DeMaw wrote, "Established theory is timeless but many amateurs do not have access to the archives that contain classical data of present-day interest. Medium-frequency DXers should appreciate this update on an historical 1922 *QST* article." Of course, in '82 few of us did have access to this sort of archival material, but, thanks to the Internet, you can read his 20 year old piece on the Beverage antenna in its entirety on the ARRL web site (<http://www.arrl.org>).

To use the web-based archived material you have to be a League member. However, many public libraries have extensive collections of *QST* magazines either in the stacks, on microfiche, or on CD ROM. Additionally, many hams have *QST* collections going back many decades and would be more than happy to lend the issue for you to read or copy.

The Beverage is essentially a wire antenna (using 10-16 gauge wire) which is laid out in a straight line (in the direction of the region you'd like to receive), is at least one wave length long (which is nearly 1,000 feet for the middle of the broadcast band), and is mounted no higher than 12 feet off the ground. It is characteristically terminated at the furthest end with a resistor (DeMaw suggests a 300 Ohm 2 watt noninductive resistor) attached between the conductor of the antenna wire and a ground made up of, as DeMaw suggests, at least 16 buried radial

wires 50 feet long.

Well, it's not the antenna for suburban lots or even a small acreage in the country. But, it should start you thinking. Is there any way you could convince the neighbors in your area to allow you to run a wire at the edge of their backyards? And, even if you could, would you be able to get an adequate ground?

If you do have the space and want to give it a shot, here are some more considerations. The Beverage is a very specialized antenna. Evidence suggests that the top end of the Beverage's reception is about 3.50 MHz so it's strictly for the low bands. Heavier wire is preferred over thinner wire.

The Beverage receives in one direction, so if you want to receive in different directions you'll be obliged to put up more than one Beverage and be able to switch between them. Either that, or you'll have to move your one Beverage in different directions. If you live near a broadcast band transmitting site, you may experience severe receiver overload.

Because these Beverages are extremely low noise receiving antennas, they are favored by hams operating on the 160 meter band. However, the very physical characteristics which make them good receiving antennas make them useless for transmitting, so hams use separate antennas to transmit, switching between the two when receiving and transmitting. In his own example, DeMaw used a 1,500 foot long Beverage pointed at Europe for receiving and a 60 foot tall vertical for transmitting.

Many have reported excellent results by using "baby Beverages" – smaller versions of this antenna. You might try a Beverage with whatever space you've got. Measure out as far as you can go on your property and see if you can stretch out at least a few hundred feet of wire.

Remember, unlike most antennas, this is one where height isn't a big requirement, but you should keep it up above head height so folks won't run into it. Also, remember that the success of this antenna depends on a good ground at the far end.

Users of full sized Beverage antennas report phenomenal reception on the broadcast band and the 160 meter amateur radio band. Try a Beverage at your location and let the rest of us know what you did and what results you had.

International HF Beacons

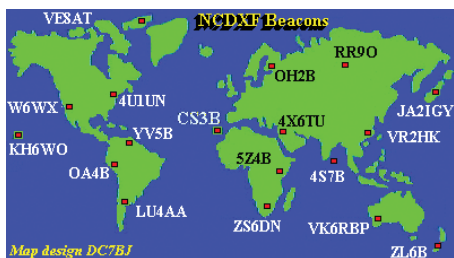
In last month's *Beginner's Corner* I referred to a list of 10 meter propagation beacons and international radio propagation beacons from 20 kHz to 25 MHz which are operated around the clock and around the world to indicate the propagation conditions for any band at any given time of day. These international beacons are primarily high power stations funded by various governmental agencies.

There is another group of beacons which you may find similarly useful to test the real capabilities of your receiver and antenna system. These stations are primarily funded and operated by amateur radio clubs around the world such as the Northern California DX Foundation, Inc. (NCDXF). The NCDXF maintains a list (see chart) of 18 international beacons at their web site <http://www.ncdxf.org>. This list includes beacons to be found on nearly every continent. As explained on the NCDXF web site, "The beacons transmit every three minutes, day and night...[which consist] of the callsign of the beacon sent at 22 words per minute [Morse code] followed by four one-second dashes. The callsign and first dash are sent at 100 watts. The remaining dashes are sent at 10 watts, 1 watt and 0.1 watts."



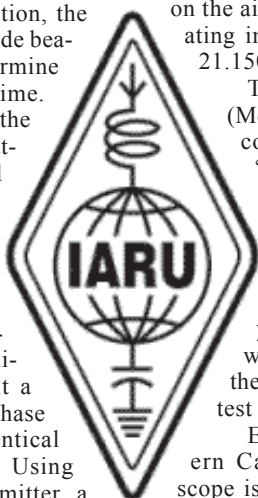
Well, that ought to give you something to shoot for!

The beacon project has an interesting history which dates back to the early '70s, shortly after the NCDXF was founded. With



the help of some of the brains behind the original Oscar satellite construction, the group decided to build a worldwide beacon network to help hams determine band conditions at any given time. The group was invited to attend the WARC-79 conference, where it attracted the attention and approval of the International Amateur Radio Union, the Paris based "Federation of National Amateur Radio Societies" founded in 1925.

Later that year the first beacon went into operation from California and transmitted without a hitch for two years. The next phase was to build and distribute identical beacons throughout the world. Using Kenwood TS-120s as the transmitter, a custom-designed control unit, and two quad loop antennas at right angles, each beacon



operated continuously for up to 12 years at 14.1 MHz.

The last phase of the beacon network came when the NCDXF/IARU group decided to expand the network, use different bands, and upgrade the equipment. The new network uses Kenwood TS-50s, donated by the Kenwood Corporation, and new controllers configured with GPS receivers to keep the whole thing running on time. The network began operating in 1995: by 1996 six were on the air. Now there are 18 beacons operating in the network on 14.100, 18.110, 21.150, 24.930, and 28.200 MHz.

These beacons transmit only in CW (Morse Code) mode. If you can't copy code, any of the readily available "code readers" will do the job. But, if you spend any amount of time listening, the repetitive nature of the transmissions will allow you to copy by hand enough characters to determine the beacon you're hearing by matching it up with the chart below. How many of these beacons can you hear? It's a real test of your listening post!

Even though it's called the Northern California DX Foundation, their scope is international and includes many projects such as the beacons which benefit hams around the world. They even offer an

annual scholarship for college kids. If you'd like to be a part of the NCDXF, you can sign up on line at their web site or call 707-794-9801 or write them at P.O. Box 1328 Los Altos, CA 94023-1328.

NCDXF/IARU International Beacons

[from NCDXF/IARU web site]

Frequencies: 14.100, 18.110, 21.150, 24.930, 28.200 MHz

| Country | Call | Location | Organization |
|------------------|--------|-----------------|--------------|
| 1 United Nations | 4U1UN | New York City | UNRC |
| 2 Canada | V38AT | Eureka, Nunavut | RAC/NARC |
| 3 United States | W6WX | Mt. Umunhum | NCDXF |
| 4 Hawaii | KH6WO | Laie | NOARG/HARC |
| 5 New Zealand | ZL6B | Masterton | NZART |
| 6 Australia | VK6RBP | Rolystone | WIA |
| 7 Japan | JA2IGY | Mt. Asama | JARL |
| 8 Russia | 4490 | Novosibirsk | SRR |
| 9 Hong Kong | VR2HI | Hong Kong | CRSA/HARTS* |
| 10 Sri Lanka | 4S7B | Colombo | RSSL+ |
| 11 South Africa | ZS6DN | Pretoria | ZS6DN |
| 12 Kenya | 5Z4B | Kilifi | ARSK |
| 13 Israel | 4X6TU | Tel Aviv | IARC |
| 14 Finland | OH2B | Karkkila | SRAL |
| 15 Madeira | CS3B | Santo da Serra | ARRM |
| 16 Argentina | LU4AA | Buenos Aires | RCA |
| 17 Peru | OA4B | Lima | RCP |
| 18 Venezuela | YV5B | Caracas | RCV |

*Intermittent Operation

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Complete hourly schedules and frequencies are found at <http://www.ncdxf.org/>

Unlicensed DX: Irish Mass

By Hans Johnson

In an atmosphere of relaxed enforcement of radio regulations, Ireland is home to a unique form of broadcasting. Here, the citizen's band (CB) on shortwave is used to broadcast church services to those too elderly or sick to attend church.

The transmissions started a number of years ago and both American and British CB channels are used for the broadcasts. The transmissions are easily heard in Ireland, but they have also recently been heard from a number of locations in the United States on Sundays during the 1200 and 1300 hours Universal time (UTC).

Programming is usually the church's mass, but can also include weddings and funerals. The audience is either given a radio or they purchase one capable of picking up the church. The sets used are regular radios that include coverage of the CB bands. A kind hand at the church manually pre-tunes the set so that the purchaser just has to turn it on and off.

The audience lives within a few miles of the church: high-powered transmitters and antennas are not needed to reach them. Since these broadcasts are technically illegal, the churches don't openly advertise or discuss their equipment set-up. One can see standard CB whips from many a church property. Transmitter powers are modest, certainly under 100 watts and probably less than 10 watts. (The legal maximum in Ireland is 4 watts.)

Dublin is the headquarters for this activity, with nearly 30 stations on the air. Other Irish cities such as Cork and Galway are also on the air. Identifying the exact church will take a bit of luck, but there will be no mistaking the Irish accent you are hearing!

The best times to try are on Sunday between 1000 and 1300 UTC and on any day between 1800-2000 UTC. The British CB band runs from 27.62125 to 27.99125 megahertz (MHz) with 10 kilohertz between channels. Channels heard in the United States include 27.68125, 27.73125, 27.78125, and 27.79125 MHz.

Tuning these signals can be a bit tricky for the uninitiated. The broadcast mode is mostly in narrow band FM (NBFM) and, while many communications receivers can pick it up, signals have to be fairly strong to demodulate. Signals in this range are also subject to deep fading in and out. It is easier to tune the side bands of these signals, as they can be heard when signal levels are lower. Once a signal is received, a DXer can step through the various modes of sideband, AM, and NBFM, seeing which provides the clearest reception.

The church broadcasting phenomenon also started in the United Kingdom in the late 1990s but was squashed by the Radio Authority before it established itself.

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More on Tower Lighting

In a previous issue, we discussed tower lighting requirements. John Diefenbach, K1TLV, Mason, NH, has some additional facts. With blinking red lights, the owner may opt to turn them off during daylight, but the tower has to be painted with red and white stripes. With flashing strobes the tower doesn't have to be painted, but the lights must flash night and day.

Thanks, John.

More on Traffic Radar Frequencies

In our February column we listed a number of microwave bands used for traffic speed radar; Don Sawicke, author of the *Traffic Radar Handbook*, reminded us of a couple related products.

Safety Warning System (SWS) signals for alerting school buses, trucks, emergency vehicles, and even passenger vehicles to hazardous train crossings, road construction, and accident sites, transmit at 24.050-24.150 GHz; and Australia's new Stalcar radar detector detector (RDD) is a multi-band receiver designed to hear the oscillators radiating from radar detectors.

Readers may be interested in visiting Don's site at: <http://copradar.com>.

Q. *I live in New York and all my favorite news teams are in California. Can I listen to the news in California with a shortwave radio? (E-mail request)*

A. Unfortunately, no. In the U.S. it is unlawful for shortwave stations to use their facilities for domestic broadcasting; all programming must be targeted outside of the U.S., thus, the definition of the service: international broadcasting.

Many U.S. shortwave broadcasters, however, favor American listeners by skewing their propagation patterns to favor U.S. population zones.

You might check with the California broadcasters on the Internet to see if they have any live feeds you can listen to on your computer.

Q. *Does the rotational speed of the earth or moon, or their respective gravities, have any affect on short-wave transmissions? (Donald Michael Choleva, Euclid, OH)*

A. None. The speed of light and radio waves is more than 186,000 miles per second, while the

rotational velocity of the earth at the equator (the fastest location) is only 0.29 miles per second. The rotational velocity of the moon is even slower, about 0.003 miles per second! And the moon's gravity is only 1/5 that of the earth. Still, studies show no significant differences in radio waves observed from terrestrial or lunar communications.

Q. *I have a discone antenna on my roof, a preamplifier at the antenna, another amplifier at the splitter below, and other amplifiers on each of my scanner inputs. I am having severe interference from a local weather channel; will the PAR or Grove FTR-100 notch filter help? (Karen Grissom, email)*

A. If the only interference you are experiencing is from the 162 MHz NOAA weather broadcasts, then I would recommend the PAR 162 notch filter, available for \$69.95 from Grove Enterprises. However, you have way too many amplifiers in line, and undoubtedly they are causing some of this intermodulation interference from signal overload. Before you order the filter, try this experiment:

Remove all amplifiers and connect your antenna directly to one scanner. Is there still NOAA intermod? If there is, you will need the filter. If desired signals are generally weak, you might wish to try replacing the ANT-09 discone with the ANT-07 Scantenna, a better receiving antenna, but not as structurally rugged as the discone.

If signals are still too weak and you need to split them into a number of scanners, you can consider a preamp. For low cost, I've had good success with the Radio shack 15-1113 (\$24.99). Any filtering would go between the antenna and the preamplifier.

Q. *Does the President of the U.S. have top secret clearance? Does everyone at Nevada's Area 51 have top secret clearance?*

A. The President is granted top secret clearance as soon as his appointment is confirmed. Every military and government installation has various levels of clearance, depending upon the respective responsibilities and accesses of the individuals assigned there.

Q. *I recently heard a telephone number being advertised on a distant radio station, and it was very close to mine. Does this mean that in other area codes, my phone number may be used? (Mark Burns, Terre Haute, IN)*

A. Absolutely. With only seven digits in the number, a maximum of only 999,999 combinations are possible in a nation with more than 200 million telephones! Only the area code remains unique.

Q. *I live in an apartment complex and cannot put up an outdoor scanner antenna. How can I improve reception beyond that on my attachable whip? (Jim Lane, Enid, OK)*

A. No indoor antenna will perform as well as an outdoor antenna, but the situation isn't hopeless. An outdoor vertical scanner antenna like the Grove ANT-07 Scantenna (\$69.95 including shipping and cable) will make a dramatic improvement, even indoors; but it's nearly eight feet tall, so you may have to tilt it somewhat in a room. You might get away with the less expensive, but well-performing, ANT-05 Omni (\$29.95, cable extra). Place the antenna against an outside wall, preferably in front of a window for best reception.

Q. *What is the spacing between sound and picture frequencies on TV channels? (Jerry None, email)*

A. In the U.S., VHF and UHF TV channels are 6 MHz wide. The AM video frequency is 1.25 MHz up from the bottom edge, and the FM audio is another 4.5 MHz higher than that. Thus, channel 5 VHF occupies 76-82 MHz, with the picture at 77.25 MHz and the sound at 81.75 MHz.

Questions or tips sent to Ask Bob, c/o MT are printed in this column as space permits. If you desire a prompt, personal reply, mail your questions along with a self-addressed stamped envelope (no telephone calls, please) in care of MT, or e-mail to bgrove@grove-ent.com. (Please include your name and address.) The current Ask Bob is now online at our website: www.monitoringtimes.com

This is the last installment in a three-part series of bright ideas I used in building the radio room in my new retirement home. February was the designing and planning phase. March covered the AC and DC power systems. This month we look at coax and antennas.

30

I wanted outdoor antennas for the following: TV, FM Radio; Amateur Radio HF, 10 meter, 6-meter, 2-meter and 440, and 222 MHz; and an all band scanner antenna (Austin Ferret). That pretty much covers the usable radio spectrum!

The Golden Rule of radio is: Your radio reception is no better than your antenna and coax. You want the best possible coax with the shortest possible run. At 3500 feet, I did not need my antennas to be very high off the roof.

Antennas for the above bands were already part of my equipment cache; I even had lots of 9913 and RG8 coax. Since all were in good condition, I saw no need to buy new. (Although all coax needs to be replaced every few years.)

31

Naturally, I planned the antenna array to be close to the radio room, but I did not want to look at lots of antennas and dangling coax. I wanted visitors to note the beauty of the area, not an antenna farm, so antennas are mounted on the sides and rear of the house. All the ham antennas were vertical gain types mounted on short 5 or 10-foot masts. The HF is a simple dipole (for now).

32

The TV/FM radio cable was already wired throughout the interior walls. I just brought the antenna end through the four-foot crawl space and hooked it up.

The ham antenna coax leads were all run down the sidewall and under the house.

The Austin Ferret all-band scanner base antenna was mounted just outside my radio room on a 5-foot mast. The RG8 run was only about 15 feet and came into the house on the exterior radio room wall. Providing a drip path and sealing up the holes should keep out the nasty weather. It was only three more feet to the splitter.

33

Beware the God of Zap! The idea is to stop the lightning before it enters your shack. Lightning/EMP surge protectors were a design feature rather than an afterthought – all tied to a system of copper ground rods. I was glad I paid extra for the four-foot crawl space. I had plenty of room to run the final piece of coax through the floor into

the radio room.

Always the worrier, I am thinking of installing an additional set of coaxial switchers or lightning surge protectors at the back of the radios, since disconnecting your antennas is not always feasible.

Do your homework for a proper ground system. Many sources claim to be the expert. Visit <http://www.hard-core-dx.com/nordicdx/antenna/feed/index.html>.

34

To feed my scanners, I used a Stridsberg MCA 204 1:4 amplifier from Grove Enterprises. I used BNC/BNC professional quality jumpers of 1-2 feet to the back of the scanners. This one-to-four device drives all four base tabletop scanners: Pro 2067, Pro 2036, Pro 2052, Bearcat 895XLT.

Luckily, three of the four are PC programmable. With several different databases for each, I can quickly change to another area of interest, such as UHF military air on the 2052. I also keep a scanner in the bedroom, one in the TV room, and a couple of handheld scanners lying around if the mood or need arises. Frankly, even the handheld radios with their rubber ducks suck in distant stations. I can even work some repeaters with my RS HTX-200 on 200 milliwatts.

35

As an experiment, I hooked up my Scout® frequency finder. I bagged aircraft signals, the neighbor's cordless telephone frequency, stray VHF and FM signals, and some very mysterious frequencies that will justify further research. I also logged the VHF repeater frequencies in use for several agencies. The high elevation has its advantages.

36

I decided to keep a high gain MFJ dual band magmount antenna in the closet of the master bedroom.

It terminates on the radio desk with a PL-259. I use it for emergencies, equipment bench testing, and experimentation. When moving these five footers around the house, watch your head room and move real slow!

37

I also found a good use for the Austin Condor rubber duck. This is a great antenna, but it seems rather bulky for a

handheld in walk-around mode. It works well as a base or stationary antenna. I put it on a suction cup on-glass mount in the radio room window. My simple listening tests tell me that it works as well as its big brother mounted 20 feet higher.

38

To meet local building energy codes, the house has thick insulation in the attic, but there is no access. Though I gained energy savings and a rebate, I lost the attic as a possible location for antennae.

When I built the garage, I planned it so I could mount a repeater in a loft at the rear. Again, the goal was a short coax run.

39

I intend to eventually put up 40-foot tower. We are talking serious lightning protection here. I will have this professionally installed. I am terrified of heights, and it is not worth my life. My last antenna raising experience was indeed my last!

40

Coax was also brought in for closed circuit TV monitoring of the driveway entrance and house exterior.

41

I also installed an Oregon Scientific Wireless weather station. The remotes broadcast on 433 MHz; I have not detected any interference to the other station equipment.

I hope these three columns have given you some food for thought. The brightest ideas often come from looking at someone else's work, and adapting them to meet your personal situation. Next month we return to the all-encompassing broad range of bright ideas. As always, I would love to hear your comments and suggestions. See you next month.



Who's Listening? Gill Lineberry

This month's spotlight hobbyist is a man we would each like to have as our next-door neighbor. At the very least, we'd like to spend some time looking through his files and database. Gill is APCO's Public Safety Frequency Advisor for North Florida. Every frequency and radio license in the area must pass his scrutiny and technical review.

My simple Internet search for Mr. Gill Lineberry returned just a few examples of his legendary career: "Association of Public-Safety Communications Officials [APCO] International Life and Senior Members," "Minutes of the Public Safety Wireless Advisory Committee [PSWAC] Spectrum Requirements Subcommittee Meeting," "National Coordination Committee" (the FCC's steering committee for the new 700 MHz public safety band), "Orlando Amateur Radio Club [OARC] HamCation Information," "OARC License Testing Committee."

It was forty-seven years ago when Gill started his public safety career. As a lifeguard on Jacksonville Beach, Florida, in 1955, he learned the ins and outs of local government service...and the politics. After transferring from the Beach Patrol to the Jacksonville Police Department, Gill's competency and political savvy resulted in an enviable, professional law enforcement career that spanned almost 20 years and reached the rank of Assistant Chief.

In the 1970s Gill moved to Orlando and became the Clerk of the Municipal Court, an administrative post that lasted four years. He transferred jobs again in 1977 to become the Communications Division Commander of the Orlando Police Department, a post he held until his "retirement" in 1992. During this period he served on a variety of national committees dealing with frequency allocations, interoperability and new system technologies.

Now well-known throughout Central Florida, Gill was next recruited by Orange County, Florida, to conduct a countywide audit of communications. Gill's work resulted in enhancements to the county's 800 MHz system and 911 telephone system. Approximately 14,000 radio IDs are programmed on the Orange County system.

"My most enjoyable event was the 1994 World Cup Soccer match in Orlando. I designed the communications center for the event and it operated for the entire month-long series of games. This was all DoD [Department of De-

fense] equipment and the federal government paid for everything. We had unlimited frequencies!" Gill recalled.

Today he still serves as the Assistant to the Director of Communications for Orange County, and is the APCO frequency coordinator as mentioned above. He is active in the Orlando Amateur Radio Club and the American Radio Relay League [ARRL] as a license examiner. Gill is also active with Navy MARS and the SHARES program. He reports that over 1,000 stations checked in on the SHARES system following the September 11th attacks.

A modified AM/FM table radio was Gill's first public safety receiver. That was followed by a Radio Shack Patrolman, then other models from Regency, Radio Shack, and Uniden. Current radios, in various states of use, include a Bearcat 210, Regency M100, Pro-2004, Pro-2006, Pro-2050, BC235, BC245, BC780, and BC895. Gill also has over a dozen various HF rigs and VHF/UHF amateur radios.

◆ On Scanner Use and Abuse

As a testament to the professionalism of hams and scanner hobbyists in the Orlando area, Gill has been known to come up on local amateur repeaters to notify them of police chases and special incidents in the Orlando/Orange County area. It sure is easy to monitor events when the communications branch is so giving of information!

"Criminals use cars much more often than they use scanners, and we're not about to outlaw cars," Gill advised. Yet, he has seen his share of abuses over the years. His biggest complaint is the publication of repeater-access tones on Internet scanner sites and frequency lists. Gill has no problem with the publication of frequencies and talkgroups, but he draws the line at tones.

"I object to PL tones being put out. There are too many instances of jamming and interference." His point is well taken, since tones are only needed to transmit and not to receive, although many hobbyists do use them to filter calls on busy, multi-use frequencies.

As for communications security, "...the

responsibility for security is on the transmit side. Everything will be digital eventually, and that's not anything against scanners. It's just that frequencies are a limited resource and digital modes allow more channels to be used (due to narrowband technology). An agency will encrypt a digital channel if it contains sensitive information."

"I'm also a big advocate of regional systems and doing away with city and county systems. I think they are a terrible waste of frequencies." Gill cites the Lower Colorado River system in Texas (covered extensively in the February 2001 issue of *Monitoring Times*) as an example of a wide-area system with many subscribing agencies, both large and small. "A big, regional system is far more efficient and has ten times more capability."

◆ On the Shape of Things to Come

Mobile, wireless data represents the future of public safety communications, according to Gill. "There is a real need for information that can only be transmitted through efficient, digital networks." Fingerprint identification data, mobile video and photo transmissions, floorplans and fire-suppression blueprints, SWAT deployment plans and aerial photos of response locations are examples that Gill says will be addressed in the next 5-10 years.

"We determined (in one of his committee assignments) that we needed 100 MHz of additional public safety radio spectrum. So far, we've only been given 24 MHz of space in the 700 MHz band and 5 MHz of space at the 4 GHz segment." Clearly, the new data technologies will make better use of existing spectrum but will not reduce the need for new channels.

"St. Petersburg, Florida, currently has a demonstration project underway in the new 700 MHz band. They don't have any adjacent channel interference (from nearby UHF television stations in that band) and they're working on these issues."

Software Defined Radios (SDRs) will be next, after the mobile data. "You'll be able to

"The battery takes up more room than the radio," Gill laughed as he explained current circuit architecture. "My county radio is about one-half radio and one-half battery, and there's still empty space in the radio half."

seamlessly use a VHF, UHF, 700 MHz, 800 MHz or any other radio that works. If the radio can find the control channel, you'll be on the air. Neither the user nor the system will care what frequency band is being used...the bands won't mean anything anymore," Gill predicted. "Talk about something that will run up the price of scanners!" This is, however, an important issue in terms of interoperability and the ability to transmit from remote sites, basements or elevator shafts.

"The Icom IC-706 [ham transceiver] is also a good example of what's to come. This one radio can handle HF, 6 meter, 2 meter and UHF. The transmitter can handle any band."

Gill adds that battery life is the greatest limitation on wireless data and video today. "The battery takes up more room than the radio," Gill laughed as he explained current circuit architecture. "My county radio is about one-half radio and one-half battery, and there's still empty space in the radio half."

As for scanners, the various digital formats may prove too diverse for scanner manufacturers unless a standard is agreed upon. "There are proprietary (digital) formats. These are not APCO-25 standard. You may end up with a scanner that has a separate card for each radio manufacturer. Or, the manufacturers may purposely avoid using a standard format to avoid scanners."

Another issue is the Electronic Communications Privacy Act (ECPA). "If there's an 'expectation of privacy,' then you're entitled to it under ECPA," Gill explained. "A key issue will also be the determination of whether a digital signal is 'commonly available.'" This will either allow or disallow digital-capable scanners.

Gill's work in the 1980s and 1990s shaped the radio spectrum and equipment specifications that we are currently enjoying, plus newer technologies that are just now coming into operation. Issues such as narrowband channel spacing, wireless data transmission services, the capacity of the public safety frequency allocation pool, and the various digital radio protocols each had the benefit of Gill's input and real-world expertise.

"I hope to retire," Gill says of his upcoming move to Texas. In reality, though, Gill will be setting up his scanners to monitor a new population of agencies and frequencies and talkgroups, and he'll still be active in the amateur radio community and MARS. Now all we need is that new address so we can sell some houses next door...

◆ On-Scene Commander: Target

Department store radio systems continue to generate mail requests and hobbyist interest. Here's the "Target Tactical" system from a Super Target department store in Lauderdale, Florida. Yes, I made up that name... they just call them Channel 1 and Channel 2 in the store. Feel free to e-mail me with other Target Tac channels, plus Wal-Mart Tac, Kmart Tac, Meijer Tac, etc. from your part of the world.

Where should you look? Start with Bob Eisner's detailed article in the December 2001 issue of *Monitoring Times* (also at [http://](http://www.monitoringtimes.com/html/exstores.html)

www.monitoringtimes.com/html/exstores.html), then check those low-power channels we've been discussing over the last few months. Move to business band allocations if you still haven't found them; the allocations are easily obtained from *Police Call* books and CDs.

Many local frequency websites also include shopping mall and department store information, such as Jim Fordyce's "Long Island Area Scanning Resources" page. Jim has an enormous database covering the entire Northeast (<http://www.fordyce.org/scanning/index.html>). Shopping mall frequencies are grouped under individual state and county listings.

"Price check in Sporting Goods please!"
461.0375 Super Target, Channel 1
466.2875 Super Target, Channel 2

◆ The Geographic Frequency List, Part 3

This month we'll create our first database in Microsoft *Streets and Trips* software. Microsoft's copyright restrictions prevent me from showing screen captures of maps and pushpins in a commercial publication, so we'll proceed with textual descriptions.

For this example, I'll tap into Mike Fink's OhioScan webpage (<http://www.ohioscan.com>). Looking in his Public Safety database and selecting 'Ohio State Police 1,' Mike lists several FCC Licenses for the State of Ohio. License information includes the agency, operating addresses and frequencies. Here's what is shown for one of the agencies listed:

OHIO, STATE OF KWF623 PUBLIC
SAFETY DEPT LIQUOR ENFORCE-
MENT
1970 WEST BROAD STREET COLUM-
BUS OH
8238 WINTON RD CINCINNATI,
HAMILTON OH
191 HAZELTON ETNA RD
JOHNSTOWN, LICKING OH
3100 REXDALE AVE CANTON,
STARKE OH
26501 EMERY INDUSTRIAL PKY
WARRENSVILLE HEIGHTS,
CUYAHOGA OH

5460 CEDAR POINT RD OREGON,
LUCAS OH
151.235
155.370
159.150

In *Streets and Trips* 2002, simply enter the first street address, 1970 West Broad Street, into the search window. The CD will spool up and a "FIND" window will open with a list of all matching records. Scroll through the list until the proper Ohio address is seen, or fill in additional city, state and zip code information to narrow the search.

When you select the proper address, the map display will immediately show you the location. When the Find window is closed, a pushpin will automatically be placed at the address and a text "balloon" (a small window associated with the pushpin) will display the address as it appeared in the search result.

This balloon may then be edited in terms of its title, content and pushpin icon. Let's go ahead and change the title to "Ohio Liquor Enforcement Office" by clicking on the gray title box and typing in our selection. A pushpin name can be up to 128 characters in length.

Next, add the three frequencies shown in the license to the content box located beneath the address. Click on the content box and type in the frequencies plus any additional information you desire. The content box can contain text, file links and website URLs.

Finally, we'll change the pushpin icon from the default symbol (a pushpin!) to a big blue box. Right-click on the pushpin and select "Properties" from the resulting window. Then select "Symbol" and pick the blue square from the drop-down list of icons. Over 200 icon designs are contained in the program.

Continue this exercise for the other addresses listed, or substitute your own address and frequency information. Next month we'll look at searching the pushpin database and importing large frequency lists into the map from other database and spreadsheet programs.

◆ On the Keyboard

Part 4 of the Geographic Frequency List project, your information requests and another spotlight hobbyist.

Links of interest from this column:

APCO: <http://www.apcointl.org>
APCO Project-25: <http://www.project25.org>
ARRL: <http://www.arrl.org>
ECPA: <http://floridalawfirm.com/privacy.html>
Icom IC-706: <http://www.icomamerica.com>
Jacksonville (Florida) Police Department: <http://www.coj.net/jso/default.htm>
Lower Colorado River Authority: <http://www.lcra.org>
National Coordination Committee: <http://wireless.fcc.gov/publicsafety/ncc/>
Navy MARS: <http://www.navymars.org>
Orange County, Florida: <http://www.orangecountyfl.net>
Orlando Amateur Radio Club: <http://www.oarc.org>
Orlando Police Department: <http://www.cityoforlando.net/police/index.htm>
PSWAC: <http://www.pswn.gov/pswac.htm>
SHARES: <http://www.ncs.gov/n3/shares/shares.htm>

Scanning Ottawa - Canada's National Capital

It's April at last and Canada is preparing to come out of hibernation. Actually we don't quite emerge from our winter hideaways until late May, but the weather is beginning to improve enough to make the occasional trek outdoors with our scanners. *ScanCan's* cross-country tour visits Ottawa this month. Ottawa is Canada's national capital and a fascinating destination for monitoring the airwaves.

❖ Ottawa's MacDonald-Cartier International Airport

I have had the pleasure of flying in and out of MacDonald-Cartier International airport many times over the last twenty years. Back in the early 1980s when I first visited the airport it was a rather limited facility; not a good welcome mat for visitors to Canada's capital city. Then a major renovation transformed it into a modern, well-equipped airport with easy access and good facilities. As the hub for Canada's capital city, it is a popular haunt for federal politicians. I have had the company of many senior members of the government on Air Canada flights in and out of Ottawa.

Ottawa also hosts a major concentration of Canada's high technology companies, and it was as a servant of one or more of these companies that I traveled there over the years to ply my trade. I did manage one pleasure trip along the way. I flew from Ottawa up to Canada's Arctic. There are direct flights from here right up to the top of the world. Arctic destinations are served by First Air. *Scanning Canada* will visit that part of our country in a later column.

Monitoring enthusiasts listening to air traffic in the Ottawa area should pay attention to an aircraft identifying itself as "Canforce One." This is a Canadair executive jet carrying the Prime Minister of Canada.

Ottawa is in the province of Ontario, nestled along the banks of the Ottawa River. Hull, Quebec, is on the other shore. Ottawa is the world's northernmost capital city. There are ten controlled airports in the Ottawa area, including several helicopter pads around the city. The largest is MacDonald-Cartier, whose ATC and navigation beacon frequencies are listed in Tables 1 and 2.

Table 1: MacDonald-Cartier Air Traffic Control

Remote Communications Outlet (RCO) Gatineau Radio (bilingual)
126.7 (Flight Information Services Enroute - FISE)
123.15 (Weather/Flight Plan)
Automatic Terminal Information Service (ATIS)
English - 121.15, 265.6,
Francois - 132.95 382.05
Clearance Delivery (bilingual): 119.4, 283.5
Ground (bilingual): 121.9, 275.8
Tower (bilingual): 118.8, 120.1, 236.6, 341.3
Terminal: (bilingual): 127.7, 124.27, 135.15, 247.0
Arrivals (bilingual): 135.15, 247.0
Departures (bilingual): 128.175, 252.5
Ottawa Flying Club: 123.35
Shell Ottawa: 123.0
Ottawa Esso Aviat: 129.85

Table 2: Navigation Beacons

VOT (VHF Omnidirectional Range Test facility): 111.8
VORTAC (VHF Omnidirectional Range/Tactical Air Navigation):
ID code = "YOW": 114.6 located at 45 26 30N, 75 53 49W
TACAN (Tactical Air Navigation):
ID code = "UUP": 108.8 located at 45 19 03N, 75 40 23W
Instrument Landing System (ILS):
ID code = "IOW" 109.5
ID code = "IRP" 110.3

❖ Ottawa Scanning Resources on the Internet

Yahoo Groups' OTTAWASCAN - is the national capital's only scanning email group. This group provides new frequencies, stories, and anything else of interest to the scanning hobby in Ottawa-Carleton, and Eastern Ontario. OttawaScan is an active discussion group with frequent revelations of new frequencies for the region. You can subscribe to the group by visiting <http://www.yahogroups.com> and signing up. This is a great free service from Yahoo at a time

Don 'Duckman' Bowlby's

Ottawa Monitoring Resources

Last Updated: Saturday March 10, 2001



YAHOO! Groups

Welcome, johndavidcorby (johndavidcorby - johndavidcorby@yahoo.com)

OTTAWASCAN - To discuss and help promote the scanner hobby in Canada's Capital Region (OTTAWA)

Visit these excellent web resources for Ottawa area frequencies.

when free services on the Internet are disappearing fast.

Don Bowlby's website <http://www.globalserve.com/~ebowlby> mirrored at <http://www.imprimus.ca/~ebowlby> is a rather excellent website for Ottawa area scanner enthusiasts. The note at the top of Don's screen advises that the site has not been updated since March 2001 (see figure 1), so some of the information may be a little out of date. Nonetheless, the content on the site is fairly comprehensive.

Don gives a good overview of police frequencies for the Ottawa-Carleton district, including OPP (Ontario Provincial Police), RCMP (Royal Canadian Mounted Police), the OCRPS (Ottawa Carleton Regional Police Service) and local MPs (Military Police, that is). Of course, if you're interested in the other kind of MPs (Members of Parliament) found in Ottawa, you will find frequencies in use on Parliament Hill on Don's site, too.

According to Don, Ottawa scanner owners use FRS radios to communicate at events like airshows. Check out FRS channel 7, 462.7125 MHz, CTCSS tone 186.2 Hz.

For MTs American readers, Canada has Members of Parliament, who "sit" in the Parliament Building on Parliament Hill. These elected representatives of the people are the equivalent of Congressional Representatives in the US. And, for American and British readers who may have seen a popular TV show about a "Mountie" roaming the streets of Chicago in his serge tunic and mountie hat, I should advise that mounties wear more subdued garb while engaged in their everyday duties. The serge uniform is usually reserved for ceremonial occasions.

If you are visiting Ottawa (and I recommend everybody visit this beautiful city some time in their lives) go in winter to skate on the world's longest public skating rink. The Rideau Canal was built by the British during the War of 1812 (the only war ever to have been fought between Canada and our good friends to the south). The canal freezes over and provides great skating; or visit the same canal in spring and see an amazing display of thousands of tulips.

Canada is warming up toward summer, the sun is shining day and night up in Nunavut and those coax connections up on *ScanCan's* antennas are looking mighty flaky - time to climb the tower. See you all in May.

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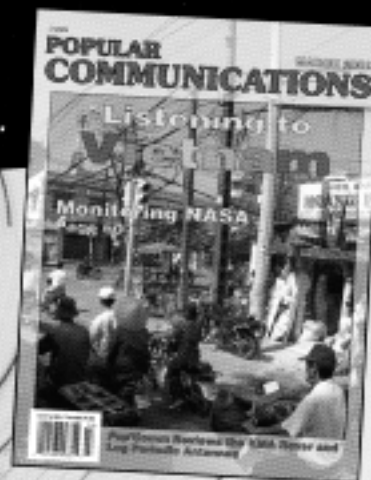
Address _____

City _____ State _____ Zip _____

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Card No. _____ Expires _____

Signature _____



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|---------|--------------------------------|---------------------------------|---------------------------------|
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| 2 Years | <input type="checkbox"/> 51.95 | <input type="checkbox"/> 71.95 | <input type="checkbox"/> 91.95 |
| 3 Years | <input type="checkbox"/> 74.95 | <input type="checkbox"/> 104.95 | <input type="checkbox"/> 134.95 |

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Popular Communications 25 Newbridge Road, Hicksville, NY 11801 Telephone (516) 681-2922

Unusual Traffic in the Middle East

For many years, listeners have known that when Israel's alleged version of the "numbers" got strange, something was up in the Middle East. Unlike most other governments, whoever's doing this particular broadcast has never tried to make all the information sound exactly the same. When they have some special callouts to make, they make them – though of course these could be diversions as well.

Something definitely seemed to be happening in early 2002. Check this month's log for "E10" (a hobbyist code for Israeli voice numbers). There was a sudden, very large spate of unique and completely abnormal callup strings. The callup string, in this case, is a three-letter phonetic repeated at the beginning of the transmission, which can start on any quarter hour. It's in a very strange, female computer voice, in English, but with an odd accent. Normal ones either have no number at the end (such as "CIO"), or the number 2 ("CIO2"), which means "no message follows." The recent abnormal ones said things like "CIOA2M2C4," all read in phonetics, sometimes repeated for hours. Shorter unique numbers were 6, 9, 22, and 23.

Additional transmissions also appeared. This, too, is something most other agencies avoid to stymie traffic analysis. 6912 kilohertz (kHz) had carriers pretty much around the clock and was heard worldwide. A listener in Jordan claims that, at one time, a very large number of parallel frequencies suddenly appeared for one broadcast.

What was all this about? Hard to tell. The news had its usual breathless reports of major intelligence operations, but these are pretty much the rule right now anyway. It seems to be a good bet that more of these nice, "numbers" rarities will appear in the future.

♦ Slot Machine Spins On

I named this particular oddity the "Slot Machine" after spending 'way too many late nights trying to make any sense whatsoever from its bizarre tones, which contain absolutely no clue as to who's making them or why. I suddenly felt like I was back in Nevada dropping quarters. It hit me that one of those gambling machines makes an unsettlingly similar noise as it spins around, eating your money.

Ultimately, ENIGMA 2000 (the new electronic incarnation of the authoritative European Numbers Intelligence Gathering and Monitoring Association), gave it the code "XSL" for "Slot Machine Oddity." John Maky, a dedicated "numbers" listener who has often contributed to this column, offered to loan me his radio if I would drop dollars into it. I respectfully declined.

For one thing, you'll have better luck in Las Vegas than in unraveling this puzzle. On upper-sideband (USB) receivers, XSL makes a jangly, semi-musical tune, over and over forever, around the clock. This is actually a unique, 6-tone, digital modulation. The only halfway plausible theory is that it's one huge crypto-lock marker. If this is true, then the occasional bursts of noise that interrupt the little tunes would be some kind of heavily-encrypted, ultra-high-speed data – the reason, in fact, for the whole thing's existence.

In the US, it's pretty easy to find XSL on six frequencies. These are 4231.5, 4291, 6417, 6445.1, 8588, and 8704 kHz. They're usually the first on and last off when the bands open and close, indicating serious power and probably directional antennas. Furthermore, every channel we hear is in perfect sync with every other one. They're dead on, like the standard time stations. There are no cheap ways to get multiple frequencies this tight. We're talking about the kind of money usually only spent by governments, or very large companies.

8588 kHz is right next to the 8300 used by Taiwan's New Star Radio Station, an AM "numbers" operation with a strange, female voice in Standard Chinese. The very similar fade in and out times, plus other listener reports, fairly well establish the origin as East Asia. Japan, China, or Korea are good bets.

And sure enough, listeners in places like Japan hear twice as many frequencies as we do. Are these separate transmitters for closer-in coverage? The full list becomes 3058, 3075, 4231.5, 4291, 5643, 6417, 6445, 6500, 6693, 6768, 8588, and 8704 kHz. Note the tendency for these to occur in pairs.

Obviously, XSL is a major operation. We'd all sure like to know whose.

♦ US Army ALE

The US homeland defense push has increased the use and complexity of military/

government networks with Automatic Link Establishment (ALE) capability. We're starting to see some of the interoperability that was always promised in the ALE standard.



US Army and National Guard are often found "sounding" (testing propagation) and calling each other. National Guard usually has the letters "NGB" (National Guard Bureau) somewhere in the ALE callsign. Sometimes, apparently, the US Customs Service is getting into the act here as well, as is the Army Corps of Engineers. This latter agency has deployed some pretty impressive field communication units. These will have "RRV" (Rapid Response Vehicle) somewhere in their ALE calls.

Many users of Charles Brain's free ALE program for the Windows personal computer have reported all four agencies on 9122.5 upper sideband (USB), usually just an Army Engineers voice net frequency. If you don't scan ALE, or don't want to overwrite radio memories, this one's currently a good place just to park and wait. I've logged some of this out here on the Left Coast, where time and propagation differences make it hard to hear all the things they report from back east. Could it be related to the Olympic Games? We'll never know.

Best yet, some ALE-initiated calls have switched to voice mode, usually in USB, though it's also worth checking the lower sideband (LSB). This answers the persistent criticism that ALE is a nice hobby exercise, but nothing all that "good" ever gets heard. This may be changing, as worldwide agencies work out their new capabilities.

ABBREVIATIONS

| | |
|----------|---|
| AFB | Air Force Base |
| ALE | Automatic Link Establishment |
| AM | Amplitude Modulation |
| ARQ | Automatic Repeat Request teleprinting system |
| AX.25 | Amateur "packet radio" computer networking |
| AWACS | Airborne Warning and Control System |
| CAMSLANT | Communication Area Master Station, Atlantic |
| CW | Morse code telegraphy ("Continuous Wave") |
| DX | Distant Transmitter |
| E5 | US CIA numbers, ten-count at start |
| E10 | Israeli numbers, phonetic callup |
| E10a | Israeli phonetic numbers, null message |
| E17 | Russian intelligence numbers, 2 messages |
| EAM | Emergency Action Message |
| FAX | Radiofacsimile |
| FEC | Forward Error Correction teleprinting system |
| GHFS | Global High-Frequency System |
| JSTARS | Joint Surveillance Target Attack Radar System |
| M8 | Cuban "Cut Number" CW (sounds like letters) |
| MARS | Military Affiliate Radio Service |
| Meteo | Meteorological |
| MFA | Ministry of Foreign Affairs |
| NATO | North Atlantic Treaty Organization |
| RSA | Republic of South Africa |
| RTTY | Radio Teletype |
| SITOR-A | Simplex Teleprinting Over Radio, ARQ mode |
| UK | United Kingdom |
| Unid | Unidentified |
| US | United States |
| V2a | Cuban "Atencion!" numbers, 3-message format |
| V13 | New Star, music and numbers, Taiwan |
| VOLMET | Aviation weather broadcast |

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| 500.0 | EJM-Malin Head Radio, Ireland, and SDJ, Stockholm Radio, Sweden, both testing at 0008. (Geoff Halligey-UK) [Related to SDJ closing this frequency at end of January. -Hugh] |
| 2643.0 | A9M-Bahrain Radio, with CW marker at 0007. (Day Watson-UK) |
| 3401.7 | Rita-Latvian packet radio net, working Rita01, Rita94, and Digi3, in AX.25, at 1920. (Watson-UK) |
| 4027.0 | Cuban "Cut Number" CW (M8), at 0305. (Camillo Castillo-Panama) [Lourdes base is closed; let's see if anything changes. -Hugh] |
| 4165.0 | MIW22- Abnormal Israeli intelligence callup (E10), at 0548. MIW23-Abnormal E10, at 1905. MIW6-Abnormal E10, parallel on 5230 kHz, at 2127. (Ary Boender-Netherlands) |
| 4268.0 | VTG4-Indian Navy, Mumbai, with encrypted CW traffic at 2121. (Watson-UK) |
| 4292.0 | IAR-Rome Radio, Italy, with CW Mediterranean weather forecast at 2036. (Watson-UK) |
| 4325.8 | "R"-Russian Navy, Ustinov, CW single-letter channel marker "beacon" at 2151. (Watson-UK) |
| 4490.0 | AAT3BFMARS-US Army MARS Region 3, sounding in ALE at 0032. (Mid-Atlantic DXer-MD) |
| 4500.0 | AFF2WV-US Air Force MARS, WV, calling the net at 0123. (MADX-MD) |
| 4620.0 | Bravo Foxtrot-US Navy, working various single-letter callsigns, in tracking net at 0633. (Tom Severt-KS) |
| 4648.0 | KPA2-Isreali intelligence (E10a), AM callup, no message at 0435, still going at 0505. (Barry Williams-AL) |
| 5170.0 | VLB6-Abnormal Israeli intelligence callup (E10), repeated for over an hour, parallel on 6930, at 2217. (Boender-Netherlands) |
| 5230.0 | MIW23-Abnormal Israeli intelligence callup (E10), at 1728. (Boender-Netherlands) |
| 5339.0 | CIOA2M2C4-Abnormal Israeli intelligence callup (E10), at 2110. CIO-Standard E10 callup, then 46-group message, at 2115. (Boender-Netherlands) |
| 5418.0 | Cuban "Atencion" AM "numbers" (V2), at 0205. "Cut Number" CW (M8), 3 messages at 0304. (Castillo-Panama) |

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| 5696.0 | CAMSLANT Chesapeake-US Coast Guard, working CG 1500 (a C-130) at 1454. (Allan Stern-FL) |
| 5708.0 | Reach 6021-US Air Force Air Mobility Command, patch to "Operations" via Croughton, at 0437. 160021-US Air Force, calling OFF, Offutt AFB, NE, in ALE at 0445. (MADX-MD) |
| 5759.0 | Cuban CW "cut" numbers (M8), and AM "Atencion" (V2), both going at once, at 0209. (Castillo-Panama) |
| 6389.0 | AQP4-Pakistani Navy, Karachi, with CW marker and 5-figure code groups, at 1903. (Watson-UK) |
| 6697.0 | Rainbow- US military, with special long EAMs at 0435. (Stern-FL) |
| 6721.0 | Dragnet Victor-US AWACS, calling Tinker AFB Ops at 1650. (Tom Severt-KS) |
| 6739.0 | Andrews-US Air Force GHFS, MD, requesting Diego Garcia to echo a Foxtrot broadcast, at 0616. (Jeff Haverlah-TX) |
| 6797.0 | Cuban "Cut Number" CW (M8), at 1202 and 1303. (Castillo-Panama) |
| 6839.0 | Accented AM English voice with 5-figure "numbers" (E17), at 0220. (Williams-AL) |
| 6841.0 | Accented AM English "numbers" (E17), at 0220. (Williams-AL) |
| 6854.0 | Cuban "Atencion" AM "numbers" (V2), at 0205. (Castillo-Panama) |
| 6855.0 | Very loud Spanish female, probably Cuban, with extremely strong AM "numbers," faint repeat of tape after sign off, at 0340. (Williams-AL) |
| 6911.5 | Trapper 4-US Army National Guard, working Charlie 11 at 0036. (Severt-KS) [See 8048.5 and 10151.5. Probably a biological exercise. Nice catch. -Hugh] |
| 6912.0 | KPA2-Isreali intelligence AM "numbers" (E10a), at 0415. SYN9-Abnormal Israeli intelligence callup (E10), in AM at 0505. Carrier is on for many hours nightly. (Williams-AL) KPA2Z3B, abnormal E10 at 0529. (Severt-KS) KPA22-Abnormal E10, at 0559. KPA6-Abnormal E10, parallel 4780, at 2138. (Boender-Netherlands) |
| 6930.0 | MIW23-Abnormal Israeli intelligence callup (E10), at 1715. (Boender-Netherlands) |
| 6940.5 | Shadow Warrior-US military, tracking targets with Blue Air Cell, at 1528. (Haverlah-TX) |
| 6987.0 | Accented English voice with 5-figure "numbers" (E17), very strong, at 0410. (Williams-AL) |
| 6990.0 | Unid-Lower sideband voice using some sort of inversion, at 0140. (Williams-AL) [Probably Mexican Army -Hugh] |
| 7657.0 | 13C-US Drug Enforcement Agency, working Panther at 0812. (Severt-KS) |
| 7889.0 | Cuban "Cut Number" CW (M8), 3 messages at 1301. (Castillo-Panama) |
| 8005.0 | Unknown UK military, many callsigns like J10, J30, M10, some voices with Scottish accents, trading encrypted test messages. (Halligey-UK) |
| 8048.5 | Trapper 4-US Army National Guard, working Plague [Bio exercises like to use disease names -Hugh] in ALE, at 0003. Charlie 12, working Trapper 4 in voice at 0103. C03, working Bloodhound in ALE at 1503. (Severt-KS) C05, working B07 in ALE at 0229 and 0231. (MADX-MD) |
| 8335.5 | DHJ 59-German Navy Wilhelmshaven, working several ships in English voice and RTTY, at 2250. (Perron-MD) |
| 8957.0 | EIP-Shannon VOLMET, Ireland, aero weather at 0300. (Ken Maltz-NY) |
| 8971.0 | Quartet 711-US Navy P-3C calling Fiddle, Jacksonville, FL, at 0029. (MADX-MD) Trident 43-US Navy, working Golden Hawk (Brunswick, ME), clear and encrypted, at 2155. (Perron-MD) |
| 8992.0 | Halifax-Canadian Coast Guard, patching Rescue 328 to Operations at 1740, then Rescue 317 to Rescue Coordination Center at 1748. (MADX-MD) |
| 9012.0 | Diego Garcia-US Air Force GHFS, working Snoop 50, came from 11181 kHz, at 2205. (Perron-MD) |
| 9016.0 | Electric-US military, probably Nightwatch net, working Pig Iron at 0832. (Haverlah-TX) |
| 9025.0 | "12"-Mexican military, working Impala, 13, 14, Gacela, Tigre, Reno, and Oryx, ALE and scrambled voice, at 1314. Sentry 11-US Air Force AWACS, patch to Raymond 24, at 1823. (Severt-KS) |
| 9090.0 | Counting Station, US Central Intelligence Agency English "num- |

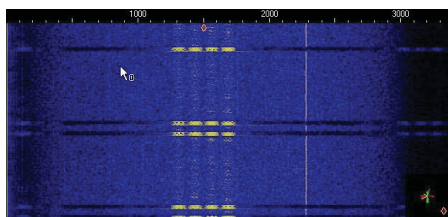
- bers" (E5), at 2205. (Sevart-KS)
- 9122.5 CGQHF1-US Army Corps of Engineers, calling SAMHF1, at 1505 and 1509. (MADX-MD) CS8-US Customs Service, sounding in ALE at 1545, then some older self-scan bursts, at 1545. CS2-US Customs, calling MVNHF424, US Army Corps of Engineers, in ALE and voice, then "back to scan," at 1621. (Larry Van Horn-NC)
- 9145.0 Brickyard-US military, IN, working Mustang in ALE at 0117. (Sevart-KS)
- 10096.0 Atlantico-English and Portuguese language air traffic control with Italia 693, at 0345
- 10151.5 Wolf 11-US Army National Guard, calling Trapper 4, at 1647. Red Rider 11, working Trapper 4, at 1954. (Sevart-KS)
- 10481.4 "Paris"-French Ministry of Defense, with an encrypted ARQ message for a very long list of French and US warships, at 1745. (Patrice Privat-France)
- 10780.0 Cape Radio-US Air Force, Cape Canaveral, FL, patching Razor 05 (JSTARS E-8C) to Raymond 19, at 1508. (Stern-FL)
- 10865.0 YT362A-Chinese diplomatic, working ZT201A in ALE, at 1452. (Watson-UK)
- 10920.0 Cuban "Atencion" (V2a), with numbers in AM, extremely strong, at 1902. (Williams-AL)
- 11018.0 Santana-Colombia drug interdiction, calling Tres Esquinas Radar Station, Colombia, in ALE at 1214. (MADX-MD)
- 11175.0 YB 934-Unknown unit, several radio checks with "772," at 0338. Reach 259Y, patch via Lajes for arrival weather, at 0410. Puerto Rico-US Air Force GHFS, with EAM at 0755. (Davenport-CO) Skier 86-New York Air National Guard, patch via Andrews to Stratton Base Ops, at 1731. PAT 525-US Army Priority Air Transport, patch via Andy to Ft. Bragg, at 1819. (Stern-FL) Milky Way-US military, with an "Exercise Pacific communications check" patch to Dandy Dan via Offutt, at 2132. (Haverlah-TX) Diego Garcia-US Air Force GHFS, patching Reach 7F4 to Matador Command Post (Rota, Spain), at 2143. (Perron-MD)
- 11181.0 Spangle 71H-US Navy, patch to Fiddle, FL, via Andrews AFB, at 2043. Diego Garcia-US Air Force GHFS, patching Snoop 50 to Banter Control (Royal Air Force, Mildenhall, UK), then went to 9012, at 2202. (Perron-MD)
- 11181.3 Crossbow Base-Unknown station directing Crossbow 1 through 8 to call "John Law Hotel" for antenna tests, at 0130. (Jack Bessler-IN)
- 11205.0 Reach 23J7-US Air Force, position for Smasher Ops, at 1513. (Haverlah-TX)
- 11217.0 Headcap-US Civil Air Patrol headquarters, calling Richmond at 2328. (Sevart-KS)
- 11220.0 Cindy 12-US military, a Distinguished Visitor mission from Ramstein Air Base, Germany, working Lajes at 2138. (Perron-MD)
- 11226.0 Darkstar Sierra-US Air Force AWACS, patch to Tinker Meteo, at 1322. (Sevart-KS)
- 11232.0 Magic 77-NATO AWACS, patch to NATO Ops via Trenton Military, at 0154; went to 9007 at 0157, 13257 at 0200, back to 9007 at 0204. (MADX-MD) Trenton Military-Canadian Forces, working Canforce 4307, set 13257 primary and 15031 secondary, at 1517. (Perron-MD)
- 11244.0 Andrews-US Air Force, MD, with two 28-character EAMs, prefaced with "All Stations," at 1520 Andrews, with a 22-character EAM prefaced "All Stations," at 1551. (Haverlah-TX)
- 11518.2 RFFTA-French Air Force, Paris, with a long encrypted ARQ message to RFFVAY, Sarajevo, at 1554. (Privat-France)
- 12710.8 PWZ33-Brazilian Navy, Rio De Janeiro, RTTY weather in Portuguese, at 0605. (Bob Hall-RSA)
- 13155.0 Last Date-US military, with a 28-character EAM simulcast on 8992 and 11244, at 2105. (Haverlah-TX)
- 13254.0 Diego Garcia-US Air Force, working unheard aircraft at 1652. (Perron-MD)
- 13750.0 New Star Radio-female with AM numbers in Standard Chinese (V13), different from message on 8300, at 1313. (Sevart-KS)
- 13907.0 Service Center-US Customs Service, OK, working 63Y, clear and encrypted, at 0010. (Perron-MD)
- 13927.0 AFA1EN-US Air Force MARS, patching Reach 852Y (US Air Force Air Mobility Command) to Lajes, at 2125. AFA1TW, patch for Reach 852Y, at 2146. (Stern-FL) AFA2XW, patching Reach 22J7 to Charleston AFB, at 2202. (Perron-MD)
- 14580.0 CYP-British Embassy, Cyprus, sounding in ALE at 1129. (Privat-France)
- 14621.7 Unid-Egyptian MFA, Cairo, calling TVVM, Kuwait, in SITOR-A at 1520. (Privat-France)
- 14867.7 Unid-Probably Egyptian MFA, Cairo, with a long ARQ message in Arabic to all stations, at 1620. (Hall-RSA)
- 15016.0 Andrews-US Air Force GHFS, Andrews AFB, MD, calling Navy LK-590, at 0312. (Perron-MD) Puerto Rico-GHFS, Salinas, PR, with a 29-character EAM at 2121. (Davenport-CO)
- 15025.0 Smasher-US Air Force, Key West, FL, calling Islander at 1407. (Perron-MD)
- 15043.0 Darkstar Sierra-US Air Force AWACS, patch to Raymond 24 at 1653. (Sevart-KS)
- 15867.0 CS4-US Customs Service Center, working A18 in ALE, then scrambled voice, old self-scan tones also heard, at 1848. (Sevart-KS)
- 15973.0 Unid-Probably Polish Embassy, Baghdad, with ARQ message to Warsaw MFA at 1525. (Hall-RSA)
- 16232.0 wjydkd-Egyptian Embassy, Kampala, Uganda, with coded ARQ message to Cairo, at 1412. (Hall-RSA)
- 16811.5 A9M-Hamala Radio, Bahrain, SITOR-A marker at 1858. (Maltz-NY)
- 16814.5 HEC-Bern Radio, Switzerland, CW marker at 1911. (Maltz-NY)
- 16816.0 ZSC-Capetown Radio, RSA, SITOR-A marker at 1926. (Maltz-NY)
- 16817.5 NRV-US Coast Guard, Guam, with CW identifier in ARQ sync marker at 1520. (Halligey-UK)
- 16820.0 IAR-Rome Radio, Italy, SITOR-A marker at 1930. (Maltz-NY)
- 16830.0 HEC-Bern Radio, Switzerland, SITOR-A marker at 1932. (Maltz-NY)
- 16830.5 SVO-Olympia Radio, Athens, Greece, CW marker at 1931. (Maltz-NY)
- 16833.5 UIW-Kaliningrad Radio, Russia, SITOR-A marker at 1935. (Maltz-NY)
- 16979.9 PWZ33-Brazil Navy, Rio De Janeiro, with FAX weather charts at 1810. (Watson-UK)
- 17146.5 CBV-Playa Ancha Radio, Chile, with weather FAX at 2230. (Watson-UK)
- 17441.5 5YE-Nairobi Meteo, Kenya, with coded RTTY weather at 1640. (Hall-RSA)
- 17550.9 RFTJ-French Navy, Dakar, Senegal, with ARQ traffic at 0931. (Privat-France)
- 17934.0 Cubana airlines, flight number not copied, calling Operaciones in Spanish, no joy, at 1934. (Perron-MD)
- 18003.0 Sentry 13-US Air Force AWACS, passing message in patch to Raymond 24, at 1553. (Sevart-KS)
- 18334.7 Unid-Probably Egyptian MFA, Cairo, with several ARQ messages in Arabic to unknown embassy, at 1545. (Hall-RSA)
- 18594.0 Service Center-US Customs, Orlando, FL, working "203" in clear and old-style "Parkhill" scrambled voice, at 1924. (MADX-MD)
- 18757.0 P6Z-French MFA, Paris, working H6L in FEC, at 1454. (Hall-RSA)
- 19031.7 Unid-Probably Pakistan diplomatic, with twinplex RTTY for Islamabad, at 1542. (Hall-RSA)
- 19131.0 Atlas-US Drug Enforcement Agency, Cedar Rapids, IA, working aircraft Flint 934, 932, and 451, beginning at 1625. (Stern-FL)
- 19850.0 V5G-Romanian MFA, Bucharest, with encrypted FEC message at 1115. (Hall-RSA)
- 23337.0 Sentry 10-US Air Force AWACS, patch to Raymond 24 at 1954. (Sevart-KS)
- 24370.0 RFGW-French MFA, Paris, with long FEC message both coded and letter-substituted, at 0920. (Hall-RSA)
- 25350.0 5AB-Benghazi Radio, Libya, CW marker, third harmonic of what was already a spurious from 8515 kHz, at 1521. (Watson-UK)
- 26132.5 ZSC-Globe Wireless node, Cape Town, RSA, with CW identifier in digital markers, at 1457. (Watson-UK)
- 26135.4 8PO-Globe Wireless, Barbados, CW identifier at 1500. (Watson-UK)
- 26859.0 Favorable-US military, with two EAMs, simulcast on 8992 and 11244, at 2018 and 2027. (Haverlah-TX)

Useful Monitoring Tools

This month we take a look at a few useful tools to have on the desktop that can help enormously with digital monitoring and signal measurement and identification. We also have a further update on Hoka's new decoder range.

◆ Digipan

Conceived by Skip Teller (KH6TY) and Nick Fedoseev (UT2UZ) as an easy-to-use software package for transmitting and receiving the popular PSK31 amateur radio mode, Digipan contains a superb and very sensitive audio spectrum analyzer. The analyzer shows about 3500 Hz of audio bandwidth arriving at your soundcard's "line in" socket as a "waterfall" (sometimes called a sonogram) display which shows about 20 seconds of past activity from the top to the bottom of the display:



In the screen-shot above you can see two stations exchanging traffic using the Mkl Clover system. One station is very strong — the brightest yellow (white here) — the other is very weak, and you can just about make out its transmissions. This shows off one of Digipan's great features — the ability to show quite clearly the structure of a signal, even if it is very weak.

Another great feature is revealed by clicking the mouse cursor on a part of the signal, and Digipan will note the signal's frequency in the center bottom "RX" window. This makes measuring tone shifts a very simple task indeed. For example, the shifts between each of the Clover tones measure out at 130 Hz. Digipan works on most versions of Windows and with any standard PC soundcard.

A shareware version of the program, called MixW, with support for decoding CW, PSK31, RTTY, PacTOR, AX.25 Packet Radio, SITOR-B and a number of other modes is also available.

◆ Hoka Decoder News

By the time you read this, the new Windows and soundcard-based version of Hoka's popular professional and semi-professional decoders should be available. Horst from Hoka sent through the following information:

"The Code 300-32 professional version is a replacement for the Code 300/Code 300-A and will be priced around \$4000 in the basic version (some additional customized options are available). The Code 30-32 is a replacement for the Code 30/Code 30-A decoder and will be priced at approximately \$2500. The 300 and 30 differ only in few functions, like remote control, operation via a TCP/IP connection and, of course, a few "special" modes. They will work on any Windows version, from 98 to XP and on any modern PC with a Pentium II 300 MHz or faster processor, and with any sound device on board. The processor power required is not too high — the basic decoder with Baudot and audio spectrum running needs about 11% of a 1 GHz Pentium. Memory requirements: the more the better, as is usual for all Windows programs. A Linux version is planned for middle of 2002."

The Code 300-32 has been out and working for a number of months now. Aside from the obvious step forward in being able to use the Code30 under a windowed operating system, there are other benefits such as being able to have a number of decoding and analysis modules displayed simultaneously, working from the same audio stream.

Asked about the future of the Code 3/Code3-Gold line of decoders, Horst added that these are likely to be available in Windows "native" versions in mid-2002.

◆ Analyzer 2000

Here's an interesting program from Germany's Brown Bear software that has a number of very useful and fairly advanced measurement (not decoding) tools for handling both FSK and PSK signals. Available as a 30-minute timed session evaluation version, the software can be registered for an \$89 fee. A more expensive professional version with more features is also available from Monteria (see the *Resources* section).

A2000 includes a versatile oscilloscope and audio spectrum analyzer, together with "waterfall" display like that in Digipan. You can accurately measure tone frequencies and levels and shifts by moving adjustable markers to the appropriate part of the signal. After having done so, you can select either FSK or PSK demodulators which can measure baudrate, timing and auto-correlation of the signal.

You can also perform more technical adjustments to average signals over time, change the FFT (Fast Fourier Transform) parameters and measure distortion and signal-to-noise ratios.

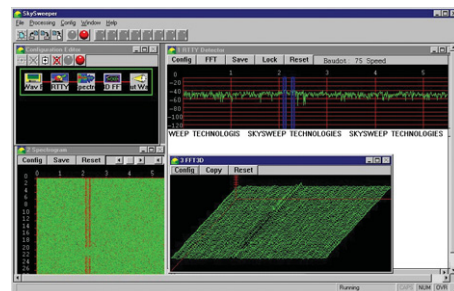
◆ Baudline

Baudline is a nice soundcard-based software package for Linux users that performs

many of the same functions in frequency, time and amplitude measurement as Analyzer2000. Probably not as "communications oriented" as the other programs, it also does some other clever stuff including probability distribution analysis, drift integration (called de-chirping), and contains a useful test generator, too.

◆ SkySweeper

This program uses a "block diagram" user interface allowing you to configure your own custom digital signal processing (DSP), decoding and/or measurement and analysis system in software. For signal processing and measurement, the program provides most of the features mentioned in the previous programs with of course, the added abilities of the DSP functions. For example, you can add blocks that filter signals, remove unwanted and annoying tones, reduce noise and shift frequencies electronically. A screenshot is shown below.



For decoding signals, there's CW, VHF ACARS, HF Fax, Hellschreiber, MFSK16, MIL-188-141A ALE, PacTOR-1, PSK31, RTTY, SITOR-A & B, and SSTV. You can even use the program to transmit many of these modes! You can download a fully functioning evaluation of SkySweeper from the site noted in the *Resources* section, and it can be registered there at a price of GBP60, about \$90. A professional version is also available from Monteria, which adds a number of more richly featured, more accurate and flexible analysis tools.

That's it for now. Please check out some of the great tools we've presented here, and do remember to support their authors if you like what you find. And please let us know about more tools for other operating systems like MacOS and Linux.

Resources

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|---------------------|---|
| Digipan | http://www.digipan.net |
| MixW32 | http://tav.kiev.ua/~nick/mixw/mixw.htm |
| Hoka | http://www.hoka.it |
| Brown Bear Software | http://www.brownbear.de |
| Baudline | http://www.baudline.com |
| SkySweeper | http://www.skysweep.com/ |
| Monteria | http://www.monteriallc.com |

CODAR Radar and Israeli Cuts

DXer Mark Mohrmann in Vermont has been in contact with the president of CODAR, the company responsible for the "swiper" whooshing sound one hears in the 60 meter band, if not also above 12 MHz. The transmissions are FCC authorized, since the tropical broadcasting band is *not* reserved for broadcasting in the US. Although it would be a major expense, Dr. Donald E. Barrick, President of CODAR Ocean Sensors, Ltd., in Los Altos, California, was agreeable to restricting the service to a smaller range of frequencies, perhaps in the 4.5 MHz area such as 4534-4594, where there are few tropical broadcasting stations.



The radar signals require a 25 kHz band to achieve an acceptable range (spatial) resolution for observing surface currents. They must operate below 5 MHz to achieve the ranges needed to be useful (to 200 km). To compensate, the radiated power is kept low: 40 watts average, 80 watts peak.

Israeli Cuts Bring Protests

The IBA Board approved the 2002 Budget after removing short-wave transmission of all but Reshet Bet (Hebrew) and Dalet (Arabic). No other languages will be transmitted, though will still be produced. The Knesset had to ratify this and all involved with overseas broadcasting were mounting a campaign to try to stop it. See <http://www.israelradio.org> with an address for protests: the responsible Government Minister is Mr Ra'anan Cohen, The Knesset, Jerusalem, Israel or raacohen@knesset.gov.il (Doni Rosenzweig, NY)

SW broadcasts in 11 languages heard daily by hundreds of thousands of people throughout the world will cease in a few weeks unless the Israel Broadcasting Authority reverses its decision to end the broad-

casts, top IBA officials told *The Jerusalem Post* Jan. 24. Politicians from across the political spectrum called the decision shortsighted and counterproductive, especially at a time when Israel is in the midst of an information war. IBA foreign-language department director Shmuel Ben-Zvi said more people listen to Israel Radio abroad via shortwave broadcasts than listen on all of Israel Radio's stations in Israel combined. Deputy National Infrastructure Minister Nomi Blumenthal, who chairs the World Likud organization, said she would also fight to save the relatively small budget for the broadcasts. Deputy Foreign Minister Michael Melchior said, "Ending broadcasts during this difficult conflict would be an irresponsible move that would harm the interests of the Israeli public." (Gil Hoffman, *Jerusalem Post*, via Rosenzweig)

It seems likely this is a deliberate ploy to draw attention to the need for a bigger budget, and elicit cross-parliamentary support for Kol Israel (© Radio Netherlands Media Network)

If any proof were needed the country often has a tin ear when it comes to making its own case in the world, the proposed cancellation of the Israel Broadcasting Authority's foreign language broadcasts settles the argument. That such a suggestion would be made shows these broadcasts do not belong under the IBA, where their importance is clearly not appreciated. A law specifically requires that the IBA broadcast in foreign languages. It is ludicrous to argue, as the IBA does, that transferring its foreign broadcasts to the Internet would fulfill this legal requirement. Israel cannot rely on government-sponsored news programs to make its case to the world, but providing credible news about Israel to people who thirst for it is an important task that should, if anything, be enhanced rather than cut (Editorial from the *Jerusalem Post* via Rosenzweig)

In response to a reception report and QSL request, received a nice letter from Sylvia Rapoport, English News Department: "I am unable to send you a QSL since Kol Israel has discontinued the use of reception reports. We still, however, appreciate hearing from our listeners." Well, another one bites the dust! They did send me an interesting "Letter from Israel" (Dave Lufkin)

AFGHANISTAN UNESCO worker and DX League member Martin Hadlow writes about his visit to R. Afghanistan, among other original articles: <http://radiodx.com/spdxr/writing.htm> (Paul Ormandy, New Zealand)

[non] Radio Free Afghanistan started Jan 30, first half hour in Pashtu, second in Dari: 0300-0400 7230 Greece, 15345 and 17725 Thailand; 1300-1400 11920 Greece, 15525 Sri Lanka, 17725 Germany; 1700-1800 6170 UAE (or Germany), 9785 and 11920 Thailand (or Philippines) (IBB website, via Wolfgang Büschel) at 1300-1400 added 13685 and 15705 via Thailand (Ivo and Angel! Observer, Bulgaria) IDs: (Pashto) *Da Azad Afghanistan Radyo*; (Dari) *Radyo Afghanistani Azad*. Reception reports can be sent to RFE / RL, 1201 Connecticut Ave, NW, Washington, DC 20036 USA. Web Site: <http://www.rferl.org/bd/af/> (Nick Grace C., Clandestine Radio Watch) Press release on start of R. Free Afghanistan: <http://www.rferl.org/welcome/english/releases/2002/01/71-300102.html> (via John Norfolk) See also KUWAIT

ANGOLA The much-persecuted, sometimes shut-down Rádio Ecclesia is hoping to receive government authorization to add shortwave to its 97.5 FM frequency. Currently it is being broadcast over the SW transmitters of Deutsche Telekom. In December, a Portuguese newspaper reported that the Episcopal Conference of Portugal had purchased all the necessary equipment for the station to begin its own SW operations and that the bishops were awaiting final authorization from the Angola government. Website: <http://ecclesia.snet.co.ao> (Catholic Radio Update)

ARGENTINA RAE, English at 0200 on 11710, was laid-back, with leisurely introduction not getting around to a bit of news until 0217; unusually good signal here but inaudible on 6060 (Glenn Hauser, OK)

AUSTRALIA HCJB now awaits the town planning appeals. The results will be known by early March. On air date is still 25 Decem-

ber 2002 (HCJB newsletter via Don Rhodes)

AUSTRIA Everest Radio discontinued via Moosbrunn Feb 5, due to lack of budget. Radio Afrika International via Moosbrunn at 1100-1200 on 17815 ended Jan 31. Continues at 1500-1600 on 17895, and will be kept during summer. So will the relays of AWR, TWR, RCI, and Voice of Vietnam (Wolf Harranth via BC-DX, via DSWCI DX Window)

BENIN R. Benin, 7210.29, opening on a Sunday at 0600 with national anthem, French ID. Better on a Wednesday when on an hour earlier on 7210.26 (Walt Salmaniwi, Victoria, BC, Canada, DX Listening Digest)

BOLIVIA 4761.67, Radio Guanay, Guanay, 0215, reactivated or extremely irregular. WRTH listed as "Radio Constelación" (Björn Malm, Quito, Ecuador, SW Bulletin)

BRAZIL 4925, at 2338 Rádio Difusora, Taubaté (SP), was reactivated in Feb at least for carnival activities (Célio Romais, Porto Alegre, *radioescutas yahoogroup*) 4924.48, heard at 2230 (Mark Veldhuis, Netherlands, SWBC topica group)

CANADA Former CBC Morningside host Peter Gzowski died Jan. 24 of pulmonary disease; he used to be relayed on RCI. The passing of "Mr. Canada" provoked a tremendous outpouring of grief and tributes in Canada, and prompted many smokers to quit (gh)

COLOMBIA 2340.16 harmonic, Radio Almirante, Riohacha, 780 x 3 at 0959, ID made by Mark Mohrmann from my recording (Hans Johnson, FL, Cumbre DX)

COSTA RICA RFPI's Interactive Radio Show Tue-Sat at 0345-0400 on 7445, 15039, tries different angles, sometimes just reads reception reports. The best of the week's shows is repeated on a Mailbag. One night tried having listeners phone one number to approve of a show, another to disapprove, not picked up, RFPI just evaluating by the different rings. Theme music is Peter

*All times UTC; All frequencies kHz; * before hr = sign on, * after hr = sign off; // = parallel programming; + = continuing but not monitored; 2x freq = 2nd harmonic; A-02=summer season; [non] = Broadcast to or for the listed country, but not necessarily originating there; u.o.s. = unless otherwise stated*

Gunn. One week's best-of was a remote from a few miles away, featuring very loud insects; another, James Latham climbing an antenna tower. Website improvements: now has a search engine to find things more easily; and contributions can now be accepted via PayPal (RFPI Mailbag)

DOMINICAN REPUBLIC On 2219.85, Radio Villa (harmonic? spur?) at 0030. This one continues to mystify. "Radio Villa, La Sencilla" IDs and bachata vocals. Villa is AM 1480, but this would either be 2 x 1110 or 3 x 740. Maybe another outlet carrying Villa programming? Raspy audio, weak signal with fair peaks (Mark Mohrmann, Coventry VT, DX Listening Digest) Notice that 1480 plus 740 equals 2220. Therefore this is a sesquiharmonic, probably arising from original 740 frequency being doubled in the transmitter to produce 1480, and inadvertently also radiating at triple (gh)

Fernando Hermón Gross, Program Manager of Cristal Internacional, 5010, needs reception reports from all over the world: cristalinternacional@hotmail.com or Apartado Postal 894, Santo Domingo, Dominican Republic. QSL card will be sent to OK reports (Pedro Sedano, Madrid, Spain, hard-core-dx)

ECUADOR On 3259.94, Estéreo Carrizal, Calceta, following previous tests carrying IDs of other stations, is now running for real, with an hour or two of music from 2330 after "Buenas tardes El Espectador" with news/information from Calceta and the province of Manabí. Owner, Sr. Ovidio Velásquez said they are very interested in listeners' reports from abroad (Björn Malm, Quito, Ecuador, SW Bulletin)

Radio Sonorama, 2480 at 1030-1105, 2 x 1240 harmonic from Riobamba, Ecuadorian folk music, lucky to catch ID on a peak (Don Moore, IA, DX Listening Digest)

HCJB is going ahead with its long-projected transmitter site move from Pifo to Santa Elena. On DX Partyline Feb 2, John Beck reported this had just been decided from several possible scenarios. Evidently Peru has decided to proceed with building a new airport for Quito, which will require that the present HCJB antennas at Pifo be leveled so they do not obstruct flight paths. The relocation, however, will just about pay for itself: \$5 million income from the sale of the Pifo property is about what it will cost to build the new site; the only problem is cash flow.

HCJB is now in the process of commencing the move. Santa Elena is between Guayaquil and Salinas near the westernmost point of Ecuador. The project bears the acronym SERVE, for Santa Elena Renewing the Voice of Ecuador. Phase one lasts through 2002; phase 3 starts in 2003, with transmission from new site to start by mid-03, but will overlap with both sites in use for a while. Move should be complete by mid-05 with Santa Elena only in use; the Pifo site is to be leveled by mid-06.

So, if you want to see the present HCJB Pifo site, do so in the next couple of years. Santa Elena is much less convenient to Quito. It takes 10.5 to 11 hours by car, or a one hour flight to Guayaquil, and 3 hours by car. Pifo is only a 40 minute drive from Quito. There are plans to put up website about the move showing plots, progress, maybe even a webcam! There is absolutely nothing at Santa Elena yet, no water or electricity.

Other HCJB news: a new program in "Mennonite Low German" is for such communities in Americas, mainly Bolivia, Mexico and Belize, Sat 2330 on 11980. In A-02 this will also be broadcast daily to Eu (HCJB DX Partyline, notes by gh) This is *Plattdütsch*, spoken here by far more than 100,000, HCJB claims. It is actually the native tongue of northern Germany (Kai Ludwig, eastern Germany)

HCJB moved its service to India at 2330-0100 from 11785 to 12035 (Allen Graham, HCJB) See also AUSTRALIA

GERMANY Südwestrundfunk, 6030 is very difficult to hear in USA, because R Marti and the Cuban bubble jammer occupy frequency. Only exception is sometimes late on Sunday night/Monday morning. At 0745 was mixing with CFVP, 100 watts from Calgary, at about equal level. Pop music, announcer in German // 7265, but much weaker than it, far too weak to be the full listed 20 kW. Carrier level about the same as German pirate R Marabú, found at times just above 49 mb. Sounds like somewhere around 1 kW (David Hodgson, TN) It really is 20 kW, but a horizontal dipole with strict figure-8 north-south pattern, so very little goes toward you (Wolfgang Büschel, Stuttgart, DX Listening Digest) German regional SW stations on 6030, 6085, 6190 and 7265 have no rights, and no protection against co- or adjacent-channel interference (Dr. Hansjörg Biener, Germany, AGDX via BCDX)

[non] From an interview with the head of the project: The last German Eurosonor-Radio program was aired Dec 29, but intended to return in three or four months. Originally used transmitter site "in Bulgaria" suffered from lacking "engineering conditions," but the switch to Krasnodar [Russia] was also driven by "administrative reasons." (Wolf Harranth, ROI/Intermedia via Kai Ludwig)

GHANA At the end of November, I visited GBC's SW transmitting station in Accra. Of the three NEC transmitters dated 1984, one is being cannibalized to keep the other two going. The GBC had shortwave stations at Tema (just east of Accra) and at Ejura (in the interior), but these are long defunct. No. 1 is used only to transmit GBC Radio 1 on 4915, No. 3 for GBC Radio 2 on 6130 (daytime) and 3366 (early morning and evening). To prolong the life of the valves they are running at below full power, about 35 kW (Chris Greenway, BDXC-UK Communication via Tony Rogers, DXLD)

GUAM Over the next two years, five virtually new transmitters, an antenna matrix switch, a test load and a new automation system will be installed which will make KSDA state-of-the-art (AWR Current via Sergey Kolesov, World DX Club Contact)

HONDURAS Radio Sonaguera, from a town near the coast between La Ceiba and Trujillo on 2541.5 (harmonic 2 x 1270), 1037-1050 with ranchera vocals, greetings and IDs. Good sustained signal, S-9 peaks. Comisión Nacional de Telecomunicaciones tells me it was authorized on 1250 from Jan 15 (Mark Mohrmann, VT, Cumbre DX)

ICELAND Ríkissýrvarið heard on 12120 USB starting at 1755 UT, very strong, not on 11402 (Karel Honzik, Czechia, hard-core-dx) New SW relay schedule of Icelandic National Broadcasting Service RUV: Eu 1215-1300 on 13865, 1755-1825 12120; Nam 1410-1440 & 1835-1905 13865, 2300-2335 12120 (Bernd Trutenau, Lithuania, BC-DX) 12120 at 2300 was almost completely

buried by very strong RTTY. They were much better on 11402 (John Cobb, Roswell, GA, DX Listening Digest)

INDIA A devastating fire broke out in the AIR Complex in Leh, damaging recording and administrative sections, put out after a three hour battle; caused by a *bukhari*, the traditional pot of coals used to warm the room. Programming was briefly affected, and 40 percent of the station was burnt. The Leh station was constructed in 1971 and renovated and re-equipped recently (Deccan Chronicle, Hyderabad via Jose Jacob, VU2JOS, dx_india@yahoo.com) A few days after the fire, 4760, AIR Leh, was heard at 0129-0158, // 4950 Srinagar until they split at 0145 (Don Nelson, OR, Cumbre DX)

AIR Kohima, 4850, Sunday morning with a Christian flavor, devotional music and many IDs at 0030 and later, both as Akashawani Kokima and All India Radio Kohima. Also, English News at 1435 (Victor Goonetilleke, Sri Lanka, DSWCI DX Window) And on a weekday, 0015-0125*, beautiful English hymns (Anker Petersen, Denmark, *ibid.*)

Some AIR SW transmitters had trouble staying on frequency: 11628 instead of 11620 at 0349 (Steven Zimmerman, WI, DX Listening Digest) And at 0230 also noted on 11628. Then 11620 service in Urdu was heard at 0300 on 11397.5 instead, and by 0400 had drifted up to 11404.22 (Jose Jacob, VU2JOS, dx_india@yahoo.com) Drifting 11395-11400 at 0200-0300, apparently the ailing Bangalore transmitter ex 11620, which was gone (Olle Alm, Sweden, DXLD) Earlier, the 9910 outlet was wandering around the 9.8 MHz area.

IRAQ [non] Clandestine Voice of the Iraqi People (via Sa'udi) heard on 4837.5, sub-harmonic of // 9675. Heard from tune in at 1725 and still audible (now with improved reception) past 2300. Best on USB after Mali appeared on 4835.3 at 1810 (Alan Pennington, Caversham, UK, BDXC-UK)

ISRAEL I read in a Danish newspaper, *Søndagsavisen*, that hundreds of citizens in Iran each Monday call a specific phone number somewhere in Europe from where they automatically are given access to the air in a live phone-in program of Kol Israel, hosted by Mr Menashe Amir and Ms Orly (Farnoosh) Ram. Iran and Israel have no diplomatic relations, so this possibility for angry Iranians to protest the Iranian Government is both illegal in Iran, and unique. They count about one million listeners per program, and their webpage has 100,000 hits per day! It is not jammed from Iran. I easily heard it at 1545-1625* on 11605, 9985 and 17545 (Anker Petersen, Denmark, DSWCI DX Window)

KOREA NORTH Voice of Korea heard after 1300 with a marvelous set of symmetrical spurs from 9335, beamed to NAM, all offset at multiples of 112 kHz from the fundamental: 9223, 9111, 8999, 8887, and 8775 and 9447, 9559, 9671, 9783, and 9895. Good old-fashioned communist propaganda, mixed with inspirational music. Makes NK sound like a paradise. What a relic! Bad frequency drift, hum, and audio was overdriven, which made the YL especially difficult to understand, but even so, overall, a great station (David Hodgson, TN, harmonics yahooogroup)

KOREA SOUTH [non] Received verification from Voice of National Salvation, 4557, very friendly letter and QSL card in 118 days, signed by "Editorial Staff of The Voice of National Salvation." I wrote to Grenier Osawa 107, 40 Nando-cho, Shinjuku-ku, Tokyo, Japan. Letterhead corresponds to NDFSK - National Democratic Front of South Korea (in Korean & English). Schedule converted to UT: 2000-0100, 0300-0700, 1000-1700 on 3480, 4400, 4450, 4557 & 1053; 1000-1200 also on 6010. English is at 0030-0100. E-mail is: ndfsk@campus.ne.jp and the web site is <http://www.ndfsk.dyn.to> The North Korea Mission is at: NDFSK, Munsu-dong, Taedonggang District, Pyongyang, North Korea. The E-mail is: ndfskpy@campus.ne.jp (Arnaldo Slaen, Argentine, DX Listening Digest)

KURDISTAN [non] Tentative A-02 schedule for Voice of Mesopotamiya on 11530, sites depending on time of day, subject to change: 0500-0700 Samara 250 kW, 188°, 0700-1100 Tashkent 100 kW, 255°, 1100-1300 Samara 250 kW, 188°, 1300-1700 Kishinyov 500 kW, 115° (Observer, Bulgaria) Most programming, traditional and modern Kurdish music, news on the hour. Later heard 15415 switching to 11530 just after 1100. Then regular schedule on 15415 0500-1100 and 11530 1105-1700 (Olle Alm, Sweden, DX Listening Digest)

KUWAIT Work on SW transmitters for R. Free Afghanistan here cannot begin until RFA is officially authorized by the House and Senate, even though money for it has already been appropriated. This is expected to happen within the next few weeks as there is widespread bipartisan support for it. The transmitters will be installed at the present MW 1548 site in Kuwait (Kim Elliott, VOA Communications World Feb 2)

LIBERIA In a surprise development at a news conference 9 February, Pres. Charles Taylor announced the "immediate" restoration of the SW frequency for the Catholic-run Radio Veritas, ELCM. The announcement came barely 24 hours after he had declared a state of emergency. Taylor said his action demonstrated that the state of emergency was not intended to clamp down on peaceful citizens nor on free speech and the press. The lawsuit of the Catholic Church against the July 2001 closure of the frequency was still pending at the circuit court. Veritas was previously reported on 3450 and 5470 (© Dr Hansjoerg Biener, Radio Netherlands Media Network)

MALAWI MBC reactivated on 7130 exactly, with good audio; closing varies between 1630 and 1730, and in the morning is on by 0600 and 3380 at night (Chris Greenway, BDXC-UK Communication) MBC Radio One heard on 3380 2145-2200*, ID and anthem before closing (George Maroti, NY, NASWA Flashsheet)

MALI RTM Bamako seems to have "locked" on 7285.9, until fadeout by 0900, play in vernacular (Carlos Gonçalves, Portugal, BC-DX)

MÉXICO The XERMX FM spur continued to be heard a month later, peaks varying between 9.2 and 9.3 MHz (Larry Will, Mark Taylor, Brian Alexander, gh)

NEPAL Radio Nepal heard back on 5005 ex-7165 in early Feb, with news in English 1730-1755, off after 1810 (Mike Barradough, UK) 5005 schedule is *2315-1815* (Jose Jacob, India, DX Listening Digest)

PAPUA NEW GUINEA Radio Gulf [3245], which had been off the air for 19 months, was switched back on Dec. 31, 2001. Radio Gulf went off in May 2000 as a result of a little button in the station's transistor blowing up, caused by the continuous blackout Kerema was experiencing, compounded by heavy rain flooding station. Radio Gulf will be on air at 1900-2200 and 0645-1315

(Fay Duega, *The Independent*, via Don Nelson, DXLD)

It's not equipment problems that keeps a lot of the PNG stations off the air (Don Nelson, *DX Listening Digest*) Don forwards stories from newspaper: R. East Sepik [3335] would still be on air if its K150,000 budget allocation for 2000 was distributed honestly and accordingly by the provincial treasury for the station's usage, Provincial Program Manager for the station Peter Yauan said (Alison Anis, *PNG Independent Online*) Radio West New Britain [3235] will in March begin charging airtime fees on all government extension programs. Mr Loma appealed to all government divisions in the province to understand the financial plight of Radio WNB and value the radio's vital role in amplifying government information to the people (*PNG Independent Online* via Nelson)

Radio Simbu [3355], would remain closed due to insufficient funding from the Simbu Provincial Government. R. Simbu's management lodged a submission for K200,000 as operational funds from the Ambane government but only K6000 was appropriated in the 2002 Provincial Budget of K30 million. According to the "Karai Bilong Mambu's" records, the station was closed last July because Elcom disconnected electricity to main studio and transmitter due to non-payment of bills. But Radio Eastern Highlands has resumed its broadcast [3395] (*Highlands Post* via Don Nelson)

PERU R. Marañón, 4835.5, has an interesting page with DX reports, sound files etc., asking for reports, at <http://www.radiomaranon.org.pe/oyentes-mundiales.html> (Henrik Klemetz, *DX Listening Digest*)

6141.04v, Peruvian from unknown location IDed as "C.P.N. Radio" at 2300, mentioned Pasco Dept. WRTN listed station is "Radio Huayllay," 6140.1 (Björn Malm, Quito, Ecuador, *SW Bulletin*)

6560.3, R. Estación 2, Huancabamba, 0120-0215*, new station, previously testing as Rdif. Huancabamba, relaying a relative's station. Announced sked 1100-1500, 2200-0300. Address: Barrio San Francisco, Huancabamba, Piura, Perú (Rafael Rodríguez, Colombia, Conexión Digital) On 6560.35, R. Estación Dos, Huancabamba, 2000 UT. New Peruvian! Previously IDed on varying frequencies as Radiodifusora Huancabamba. On 6524.07, R. El Libertador, Bagua Grande, 0050. Name probably hints at something religious, or in Feb celebrating "El Libertador" Simón Bolívar. It had not been heard since the previous Feb (Björn Malm, Quito, Ecuador, *SW Bulletin*)

R. Cielo, Chiclayo, heard regularly on 6299v by Björn Malm: When I was in Chiclayo, I visited Radio Imperio, 4388.9, transmitter manufactured and designed by Cielo Salazar, who also has a very small hobby radio station named "Radio Cielo" in his house, about 100 watts (Takayuki Inoue Nozaki, Japan, *DSWCI DX Window*)

CPN Radio, Arequipa, 6141.04v, 1100-1120 reactivated with newscast (CPN = Cadena Peruana de Noticias). Formerly used by Radio Concorcia but sold to CPN and now 100% relay of Lima programs (Takayuki Inoue Nozaki, Japan, *Cumbre DX*)

PHILIPPINES R. Pilipinas, English at 0230-0330 on 12015, ex- 11885, 250 kW, 283 degrees via IBB Tinang site \ 15120 & 15270 (Roland Schulze, Philippines, BC-DX)

RUSSIA Radiostantsiya Tikhii Okean has eliminated its SW 7175, and LW. Only 810 kHz Vladivostok has been used this year (Hironao Oguma, Tokyo, *Japan Premium*)

SOUTH AFRICA Radio Veritas Productions, headed by Dominican Father Emil Blaser, is looking seriously at SW radio as the best way of getting on the air, according to its website <http://za.op.org/veritas>. Radio Veritas, which operates a solid audio-visual program production center, and whose programs are furnished to various community radio stations, has been looking to have its own station in South Africa (*Catholic Radio Update*)

SWITZERLAND Bob Zanotti announced he was leaving SRI, taking early retirement in February (Kim Elliott, *VOA Communications World*)

TAIWAN [non] Contrary to last month's report, RTI still heard with Chinese lessons in English, at 0247 on 5950, 9680; also in Spanish on 15215 (gh)

TURKMENISTAN News in English at 1540-1545 on 4930 (Rumen Pankov, Bulgaria, BC-DX)

UKRAINE The 1000 kW Mykolaiv transmitter to NAm on 7375 has been off the air since Jan 16. The reason is a debt for the electricity. A week later, the Kyiv transmitters went off, leaving only three at Khar'kiv for RUI program. For current frequency info see http://www.nrcu.gov.ua/eng/program/vsru/world_map.php3 and click the map on your zone (Alexander Yegorov, RUI via Craig Krist, *DX Listening Digest*) Said 7375 for zone 8 was off; never even tried to serve zone 7 (Glenn Hauser, CIRAF Zone 7) Later in Feb, RUI frequencies from the Brovary site resumed (Olle Alm, Sweden, DXLD)

U K [non] Laser Radio plans to broadcast via 100 kW shortwave from Jülich, Germany (from <http://laserradio.net/schedule.htm> via Mike Terry, UK, *DX Listening Digest*)

U S A FCC has issued a major document on the future of HF broadcasting, 66 pages PDF with lots of footnotes: http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-02-27A1.pdf Notice Of Proposed Rulemaking And Order in ET docket 02-16 (via Donald Wilson and Benn Kobb)

With sadness, I must inform you that I will leave *Communications World* after the February 23 program. I will return to audience research at VOA, which was my profession before I became host of *Communications World* in September 1995. I will miss most of all the support of my listeners, whose participation was the main reason the program succeeded. VOA does not plan to continue *Communications World* under a new host, at least for the time being (Kim Elliott, Feb 5, *DX Listening Digest*) We shall greatly miss your presence on the air, and *Communications World*, but glad you are able to go back to your primary profession (Glenn) Thank you, Dr. Elliott, for your wonderful work. You will be missed (John Norfolk, OK, swprograms topica group) You will be missed not only for the fine quality of the programs you produced, but in the spirit that they were produced (Larry Nebron, CA, *ibid.*)

A VOA journalist who scored an exclusive and controversial September interview with the Taliban leader, Mullah Mohammed Omar, has been taken off the air and reassigned to what she and the agency's news director call a "useless job." The reporter and the news director assert that the job change

is in response to outside pressure that has prompted the VOA's chief to impose a ban on interviews "with any official from nations that sponsor terrorism." Allegations were brought by Spozhmai Maiwandi, an Afghanistan native who has worked for the VOA in Washington for 20 years, the last 10 as head of the agency's Pashtu language service. "I am being punished for the fact that I did a good job, that I did my job," Maiwandi said (James Warren, *Chicago Tribune* via Daniel Say, Chet Copeland) The Committee to Protect Journalists is also concerned about this: <http://www.cpi.org/news/2002/USA17jan02na.html>

A lot of RFE/RL jobs offered at Prague RL HQ, as well as a Chief Engineer post at Washington, D.C.: <http://www.rferl.org/welcome/english/jobs> (BC-DX)

Photos of VOA Delano, mainly antennas: <http://hawkins.pair.com/voadelano.shtml> (via George Thurman, TX)

[non] The modern era of leasing for the IBB got underway in 1992 with the collapse of the Soviet Union. It began by leasing some of the Russian and Armenian transmitters for just a few hours a day. They now have leasing agreements with 17 separate entities from 20 different sites and are leasing in excess of 60,000 hours annually. Their budget exceeds \$10,000,000. Leasing agreements provide about 13% of the total hours for the VOA, RFE/RL, and RFA. The trend is toward more medium wave leasing. At present, 50,000 of the 60,000 annually leased hours are SW (*NASB Newsletter* via BC-DX)

If you hear an interval signal sounding like Channel Africa, watch out; it may just be WWRB. Heard testing at 1600 on 12172 and 9320 using Channel Africa IS spliced with same loop announcement they ran previously (Hans Johnson, FL, *Cumbre DX*) Also tested on 15725 Sunday at 1728 with RSA chirping bird IS, guitar melody (Paul McDonough, MA, *DX Listening Digest*) 15725 occupied weekdays by WRMI instead (gh)

In no way is WWRB trying to offend anyone with this; we may try some other defunct 'IS' to make this test period fun! I sure beats tones. Reception reports will be replied with a multi verification reception certificate. Not an ordinary 'QSL' card. Reports to: WWRB, Box 7, Manchester, TN 37349-0007 (Peter Taggart, Operations Manager WWRB via Dave Frantz)

Still a fugitive in mid-January, Steve Anderson's value was quadrupled by the BATF to \$20,000 - the reward for info leading to the arrest of the former United Patriot Radio clandestine SW broadcaster. (See MT feature article in this issue - ed.) Anderson, 54, has been on the run since Oct. 14, 2001. He fled after firing multiple gunshots at a Bell County deputy sheriff who was attempting to stop him on a traffic violation. If you spot Anderson, immediately notify your local law enforcement agency, the Kentucky State Police at 606-573-3131 or 1-800-222-5555 or the Bureau of Alcohol, Tobacco and Firearms at 888-283-8477 (*Somerset KY Commonwealth-Journal*)

Other preachers on WBCQ, including former followers, are going after Brother Stair for running a cult, allegedly taking advantage of folks and their property, allegedly taking advantage of young and older women. A police report and testimonials are at <http://www.thenetteam.net> This was *Table Of Truth* heard UT Thu and Fri 0200-0300 on 7415 (Bob Thomas, CT) Another anti-Stair broadcast on WBCQ, 17495, at 1700-1800 several days per week is *The True Remnant*, with a former member of the commune painting a picture of Stair's ruling with an iron hand (Max Swanson, *DX Listening Digest*)

It appears that WSHB in South Carolina will follow in the footsteps of KHBI Saipan, which was sold in 1998. Sources at the Christian Science Publishing Society say that they are in the process of selling the station, after which they will reassess their options for future broadcasts, not completely closing the door to CS broadcasts, but not at the present level. WSHB began on 12 March 1989. Everything points to 2002 being its final year as a CS mouthpiece (Eduard Borda, via Pedro Sedano, Spain, *El Dial*)

KTBN, Salt Lake City, previously heard on 2nd harmonic, and now on 3rd: 22530 at 1413 Jan 26 (David Hodgson, TN, *harmonics yahoo*group) Three 50 kW stations have been heard on their third harmonics: WOR on 2130 at 0944; WPHT on 3630 at 1038-1101; and WTOP on 4500 at 2234; also 1 kW WIOO, Carlisle PA on 3000 at 2300 (Mark Mohrmann, Coventry, VT, <http://www.sover.net/~hackmohr/> *DX Listening Digest*)

Remember that the A-02 mid-year SW frequency season begins March 31, with frequency and time changes affecting most international SW stations, and a week later, private US stations, notably WWCR, WBCQ and WRMI, shift programming times one UT hour earlier to keep up with DST. Tentative *World Of Radio* schedule on WBCQ: Wed 2330, Thu 0500 on 7415; on WWCR: Thu 2030 15685, Fri 0930 9475, Sat 0500 5070, Sun 0230 5070, Sun 0630 3210, Mon 0000 3210 (summer on 9475), Mon 0500 3210.

VATICAN A Rome judge threw out a criminal case against three Vatican Radio officials accused of polluting the air with electromagnetic waves from the station, ruling that Italy has no jurisdiction over them (AP via *LA Times* via Jim Moats)

VENEZUELA [non] Aló, Presidente, Hugo Chávez' Sunday morning talk show is still occasionally heard via Habana around 1400-1830, best on 9820, also announcing 6140, 9505, 11705, 11875 (gh) Reviews of his Sunday exercise as filtered thru main opposition newspaper *El Nacional* are at http://www.el-nacional.com/actualidad/alo/alo_presidente.asp (Henrik Klemetz, Sweden)

VIETNAM [non] Voice of Khmer Krom Radio in Khmer via Vladivostok, Russia, 250 kW, 230°: 1400-1500 Fri only on new 11985, ex 7515 to avoid CNR-1 in Mandarin Chinese. But for A-02 is registered on 11685 instead (Observer, Bulgaria)

Another clandestine, R. Free Vietnam in Vietnamese via Tashkent, Uzbekistan, 200 kW, 130° 1400-1430 Mon-Fri on 11880, ex 11850 to avoid CNR-1 in Mandarin Chinese (Ivo and Angel! Observer, Bulgaria)

ZIMBABWE [non] Newsweek interviewed the founder of SW Radio Africa, Gerry Jackson, [who by the way, is a white woman]: <http://www.msnbc.com/news/698256.asp> (via Kim Elliott)

Until the Next, Best of DX and 73 de Glenn!

0001 UTC on 4876.5

BOLIVIA: Radio La Cruz del Sur. Aymara programming including ID, "Radio la Cruz del Sur..." into Bolivian regional music. Other Bolivian stations audible: **Radio Mallku** 0007-0011, 4796.5; **Radio Santa Ana** 0026, 4649.1; **Radio Paititi** 0029, 4681.6; **Radio Yura** 0036, 4716.8; **Radio Illimani** 0050-0100, 6025; **Radio Fides** 2345-2351, 6155. (Arnaldo Slaen, Buenos Aires, Argentina)

0003 UTC on 12095

ASCENSION ISLAND: BBC Relay. News focus on Africa to Outlook segment; 0030 on 11765 with IDs. (Stewart MacKenzie, Huntington Beach, CA)

0005 UTC on 11585

ISRAEL: Kol Israel. IDs and info to interviews and talk //7545; 9390 at 2210; 0044 at 11585. (MacKenzie, CA)

0008 UTC on 5020

SRI LANKA: SLBC. Regional music to short announcement, followed by ID in Tamil service. Subcontinental music to same format. Time signal at 0030 then talk sounding like news. Not the first time I've heard this commercial service in Tamil, but certainly isn't a daily catch. (Mark Veldhuis, Netherlands, HCDX) **Deutsche Welle relay** 0012 on 11985. Radio Japan relay-**Sri Lanka relay** 2132 on 21670 & 2124 on 17825. (MacKenzie, CA)

0010 UTC on 4940

PERU: Radio Frecuencia San Ignacio. Spanish time check to local commercials and regional messages. SINPO 23322. Peruvians audible on consecutive monitoring; **Radio San Antonio** 0010+, 4940; **Radio Cusco** 0014+, 6193.5; **Radio Santa Rosa** 0022-0025, 6045.5; **Radio Huata** 0031-0035, 4746.8; **Radio Ilucan** 0036-0040, 5678; **Radio Cultural Amauta** 0037+, 4955; **Radio Andina** 0040-0045, 4995.7. (Slaen, ARG)

0100 UTC on 11800

ITALY: RAI. News item on Italian Navy to aid Afghans. (Bob Fraser, Cohasset, MA; Frank Hillton, Charleston, SC) **IRRS** 13840 at 1114 relaying Radio Casablanca in German. ID heard from the web page and checked for parallel with this frequency. Freq 7120 was S4-5 but clearer. (Zacharias Liangas, Retziki, Greece/HCDX)

0100 UTC on 9945

NORWAY: Radio Norway Intl. Norwegian. Newscast and interviews. (MacKenzie, CA) 0100 on 7470 NRK domestic service. (Stokes Schwartz, Minneapolis, MN)

0322 UTC on 4930

TURKMENISTAN: Turkmen Radio. Light classical music to Turkmen identification and talk at 0324. Program change at 0330 with gong signal into music. Good signal, little fading, best to monitor in LSB. (Mark Fine, Remington, VA)

0342 UTC on 3346

BELARUS: Radio Mayak. Pops and light rock music with Russian vocals. DJ style quick announcements over intro music to news at the hour. Strong, clear signal with RTTY bursts. (Fine, VA)

0350 UTC on 9885

BOTSWANA: VOA Relay. News items to Money & Business and VOA News Now. ID at 0317. (MacKenzie, CA) 1943-1958 on 17895. (Fine, VA)

0525 UTC on 15215

SOUTH AFRICA: Channel Africa. News topics from the continent including focus on fighting in Kenya. Fair signal quality. (Howard Moser, Lincolnshire, IL) Signal noted 1815 on 17870 with economic news update and political party story. (Tom Banks, Dallas, TX) 1825-1830 on 17870. (David Weronka, Benson, NC)

0627 UTC on 4760

LIBERIA: ELWA. Soft local music and to readings of listener's letters at 0633. Good, readable signal with no interference, despite high noise levels on 60 meters. (Fine, VA)

0726 UTC on 4990.95

SURINAME: Radio Apinite. Dutch. Popular music by DJ format. Station ID at 0728, occasional interference but otherwise fair signal. (Fine, VA)

0816 UTC on 6010

CHILE: Radio Parinacota. Andean music to time check, "cinco de la mañana con 23 minutos". Station identification at 0833. SINPO=24342. (Slaen, ARG)

1215 UTC on 17500

BULGARIA: Radio Bulgaria. Commentary on Bulgarian/Russian relations, //15700. (Fraser, MA) Bulgarian service 0040, 11600 music // 5900; 0045 on 9400 //7400 English interviews. (MacKenzie, CA)

1720 UTC on 15184.58

EQUATORIAL GUINEA: Radio Africa. English religious sermons. Good signal with little adjacent interference and somewhat muddy, under modulated audio. Unheard on this alternate frequency for quite a while. (Fine, VA)

1827 UTC on 9550

BANGLADESH: Bangladesh Betar. English service including ID, "you are listening to the external service of Bangladesh", followed by regional music. Good signal with hum audio interference. (Fine, VA)

1900 UTC on 12005

TUNISIA: RTV Tunisienne. (Tentative). Arabic at tune-in to 2158*. Male/female announcers with phone calls to French/Arabic version of Happy Birthday. (Lee Silvi, Mentor, OH)

2100 UTC on 4950

ANGOLA Radio Nacional. Portuguese news headlines and brief music bridges. Signal at S5, very good signal. (Liangas, GRC/HCDX)

2122 UTC on 7415

USA: Radio Caroline via WBCQ. Rock music program to ID, "Radio Caroline around the world 24-7". Mentioned WBCQ relay with 50 kW. Excellent signal quality. (Frodge, MI) **WFLA** 2200, 25870 with fair signal. (Banks, TX) **WWCR** 5070, 2234 with S7 signal. (Liangas, GRC/HCDX)

2138 UTC on 17735

PHILIPPINES: VOA relay. Lady announcer's interview on terrorism; 11925 at 0018. (MacKenzie, CA)

2155 UTC on 5985

CONGO: Radio Congo. Presumed this station's French service to local Afro pops. Possible news from 2200, but heard no identification. Interference from WYFR's *2200, well covered and supposedly from Florida. (Frodge, MI)

2202 UTC on 9779.62

YEMEN: Rep. of Yemen Radio. Arabic news items read by male announcer with brief music clips between each item. Qu'ran readings to another announcement until 2224, followed by national anthem and late 2225*. Good signal with slight fading. Monitored in LSB to avoid VO Iran on 9780. (Fine, VA)

2216 UTC on 7160

MOROCCO: RTV Marocaine. Regional style Arabic music to brief announcer's French identification. Signal fair to poor as signal fades and decreases in quality. (Banks, TX) 15335 at 2205 with poor modulation for Arabic/French service. (Duane Hadley, Bristol, TN) **VOA relay** 2218 on 9645; 0435 on 9665. (MacKenzie, CA)

2234 UTC on 9760

CYPRUS: CBC. Fair signal quality for Greek service //6180, 7205. Greek folk music and several mentions of Cyprus and station information. (Sam Wright, Biloxi, MS)

2232 UTC on 12045

ANTIGUA: Deutsche Welle relay. Interviews to music and *It is Time to Say Goodbye* // **Rwanda** relays on 15410, 13780, 17860; **Portugal** relay 12000. (MacKenzie, CA)

2305 UTC on 4980

VENEZUELA: Ecos del Torbes. Announcer's Spanish talk and text over music, S6 signal with low modulation. (Liangas, GRC/HCDX)

2335 UTC on 9885

GERMANY: Swiss Radio Int'l relay. Quick item that Army life is still a worthwhile option, //11660 fluttery signal. (Fraser, MA)

*Thanks to our contributors – Have you sent in YOUR logs?
Send to Gayle Van Horn, c/o Monitoring Times (or e-mail
gayle@webworkz.com) Please note: paper strips and cassette
recordings will no longer be accepted.
English broadcast unless otherwise noted.*

QSLing the World...with Globe Wireless

The Global Wireless Maritime network is leading the world in global maritime communications. Services for the coastal and shipping industry include fax, telex, electronic mail, weather and Inmarsat satellite services. The company also offers messaging services using new modes.

Over the last few years, marine communication modes have dramatically changed. Morse code (CW) has all but disappeared, and SITOR modes are rarely seen. With the advent of HF email services, newer modes have replaced the old standbys. Globe Wireless uses two new modes to support its email services: GW-Clover and GW-FACTOR. For more information on where to listen, refer to this month's *Who's Who, Part Four*.

Globe Wireless Network

| | |
|---------|---|
| 8PO | Bridgetown Radio, Barbados |
| 9MG | Georgetown Radio, Pinang Island, Malaysia |
| A9M | Hamala Radio, Bahrain |
| CPK | Santa Cruz, Bolivia |
| HEB/C | Berne Radio, Switzerland |
| HLF | Seoul Radio, South Korea |
| KEJ | Hoohehua Radio, Hawaii |
| KFS | San Francisco, CA, United States |
| KHF | Agana Radio, Guam |
| KPH | San Francisco, CA, United States |
| LF/LG | Rogaland Radio, Norway |
| LSD 836 | Buenos Aires, Argentina |
| SAB | Goeteborg Radio, Sweden |
| VCS | Halifax Radio, NS, Canada |

| | |
|-----|--------------------------------------|
| VCT | Tors Cove Radio, NF Canada |
| VIE | Darwin Radio, NT, Australia |
| VIP | Perth, WA, Australia |
| WCC | Chatham Radio, MA, United States |
| WNU | New Orleans Radio, LA, United States |
| XSV | Tianjin Radio, China |
| ZLA | Awanui Radio, New Zealand |
| ZSC | Cape Town Radio, South Africa |

Reception may be reported for any Global stations in the network. Information should contain the date and time (UTC) of your reception, call sign of the network station heard, the actual frequency or ITU channel number, mode of transmission heard, signal strength and quality. Don't forget to report any signal interference observed on frequency or adjacent channels, as well as who the network traffic was working. Include a complete mailing address with all reports for your QSL reply.

DXers will receive one QSL card for each Globe Wireless coast station received and correctly reported. Reports from ships at sea are requested to include either the address of the vessel's home port or the Radio Officer's personal address. Please send your reception reports for all Globe Wireless network stations to: 550 Pilgrim Drive, Foster, CA 94404 USA.

For additional information on the Globe Wireless network, visit their website at <http://www.globewireless.com/>



CLANDESTINE

The Voice of National Salvation, 4557 kHz. Full data friendly letter signed by "Editorial Staff of the Voice of National Salvation." Reply received in 118 days. Report sent to: Grenier Osawa 107, 40 Nando-cho, Shinjuku-ku, Tokyo, Japan. The letterhead corresponds with the NDFSK National Democratic Front of South Korea. Email and web address: ndfsk@campus.ne.jp <http://www.ndfsk.dyn.to> (Arnaldo Slaen, Buenos Aires, Argentina)

CZECH REPUBLIC

Radio Prague, 11615 kHz. Full data initialed QSL card, plus pennant, program schedule and station booklet. Received in 31 days for an English report. Station address: Vinohradska 12, 120 99 Prague, Czech Republic. (Joe Squashic, Wake Forest, NC)

ECUADOR

HCJB, 9745 kHz. Full data 70th Anniversary card-Ecuador's *Fiestas*, signed by John E. Beck-Station Manager. Books and pocket calendar enclosed. Received in 45 days for an English report, and one US mint stamp. Station address: P.O. Box 17-17-691, Quito, Ecuador. <http://www.hcjb.org/english> (John Vercellino, Downers Grove, IL)

FINLAND

YLE/Radio Finland, 15400 kHz. Full data *Short-wave Center of Radio Finland* card, signed by Mr. Raimo Makela, plus schedule and sticker. Received in 115 days for an English report and one IRC. Station address: PL 113, 28101 Pori, Finland. (Vercellino, IL)

MEDIUM WAVE

KBSU, 730 kHz AM. Full data letter signed by Steve Johnson-Director of Engineering & Operations, plus Boise State Radio info card, and station bumper sticker. Received in 23 days for an AM report. Station address: 1910 University Dr., Boise, ID 83725. (Patrick Griffith, Westminster, CO)

KDFO, 800 KHz AM. Verification letter initialed by J.W. Received after phone call to station. Station address: 100 Mohawk St., # 280, Bakersfield, CA 93309. (Patrick Martin, Seaside, OR)

KWHN, 1650 kHz AM. Partial data verification letter signed by Gary Elmore-Program Director. Letter notes KYHN 1320 AM is parallel with KWHN. Received in 20 days for an AM report. Station address: 423 Garrison Ave., Fort Smith, AR 72901. (Griffith, CO)

KZTK, 970 kHz AM. Verification letter initialed by same verify signer for KDFO. Received after phone call to station. Station address: 1706 Chester Ave., # 311, Bakersfield, CA 93301. (Martin, OR)

WNMT, 650 kHz AM. Friendly partial data letter signed by Kristi Garrity-General Manager, plus business card and coverage/rate card for Midwest Radio Network. Station address: 807 W. 37th Street, Hibbing, MN 55746. (Griffith, CO)

UTILITY

Argentina-LSD836, Argentine Radio, 8418 kHz USB. Full data verification letter signed by Juan Manuel Avila-Jefe Estacion. Additional personal letter stating LSD836, is the only Argentine coastal station currently in operation. Received

in 15 days for a utility report. Station address: Espinosa 1045, Buenos Aires, Argentina. (John Wilkins, Wheat Ridge, CO/*World-Wide Utility News*) (or QSL via Globe Wireless, CA address)

Greece-SVO, Olympic Radio 22387.5 kHz USB. Full data computer-generated QSL signed by I. Troylis-Manager, plus an old SVA-Athens Radio card. Received in 27 days for a utility report and one U.S. dollar. Station address: O.T.E., Tech. Service, Achilleos 14, Pyrgas 27100, Greece. Address on reply envelope: Assemblage of Maritime Communications, 85 Patision Str., 104 34 Athens, Greece. (Wilkins, CO/WUN)

Poland-SPB, Szczecin Radio, 13022kHz USB. Full data verification letter with illegible signature, plus scenic card. Received in 102 days for a utility report and one US dollar. Station address: Rkco Szczecin Radio, Trzesczyn, 72-004 Tanowo, Poland. (George Clement, Powder Springs, GA)

USA

WTJC, 9370 kHz. Full data QSL card signed by A. Robinson, plus calendar, program schedule and WTJC bumper sticker. Received in eight days for an English report and return postage. Station address: 520 Roberts Rd., Newport, NC 28570. (Vercellino, IL)

VIETNAM

Voice of Vietnam, 5925 kHz. Full data QSL card unsigned, plus friendly greeting card and program schedule. Received in two months for an English report. Station address: 58 Quan Su, Hanoi, Vietnam. Email: btdn.vov@hn.vnn.vn. (Giampiero Bernardini, Milan, Italy/*Hard Core DX*)

Thinking Locally; Listening Globally

Those new to shortwave may initially think of it as solely a long distance medium used by international broadcasters to transmit programming specifically designed for an audience otherwise unconnected with the originating country. But this is far too narrow a perception; and, as it turns out, it's not all that accurate either.

Tropical band stations (using 120, 90, 75 and 60 meters), China, India, Indonesia, and others use shortwave as a means of transmitting programming to a local audience. The fact that we can hear some of these Latin American, African and Asian stations in North America, when signal propagation conditions are favorable, may give us some pleasure as well; but such pleasure is wholly unintended.

Some of our U.S.-based "independent" shortwave stations may claim to be broadcasting to Europe or Canada or Africa. However, the truth of the matter is that they are targeting a stateside audience and saying otherwise so as not to run afoul of the Federal Communications Commission.

◆ "Going Native"

Even the general presumption that international broadcasters craft their own productions for international audiences is not uniformly true. As budget pressures have whittled away their ability to produce their own programming, a growing roster of stations have turned to their domestic counterparts for content. **Radio New Zealand International** has done this for decades. Domestic CBC Radio One programs such as *As It Happens*, *This Morning*, *The World at Six* and *Global Village* have been a staple of **Radio Canada International's** schedule for years. **Radio Australia** draws over two-thirds of its around-the-clock schedule from its ABC domestic radio partner, Radio National. Even a few programs from BBC Radio 4 show up on the **BBC World Service** schedule.

This practice is not confined to English services. **Radio Japan's** service in Japanese now pulls all of its content from NHK Radio 1. **Radio Norway International** recently closed its Norwegian language production unit in favor of relaying programs from its three domestic networks. Some of **Radio Sweden's** Swedish broadcasts are relays of Sveriges Radio Programmen 1 and 4.

◆ A Truer Representation?

What all this provides to the listener is a way to eavesdrop on what's really going on in a country. The programs produced for a domestic audience may be a little less understandable to an extra-territorial audience since, in domestic radio, knowledge about certain points of reference are assumed. An international service takes greater pains to explain things that a listener not steeped in the culture would not be likely to know. On the other hand, a domestic channel may not be "on its best behavior," as it were. As with families, things may be said to a local audience that would not be aired "outside the home."

Of course, for most of us, this is much easier to do with stations whose homelands speak English! Nonetheless, there is something more compelling, certainly more exotic, about listening to a domestic service in whatever language it may be speaking. The sensation of traveling vicariously can be more intensely felt – especially if one turns down the lights and closes one's eyes. The music, the ads, the speaking cadences and voice inflections of the announcers all add to the experience. At this point, it doesn't take much for one's imagination to fly – and the fact that it all may not be in English can enhance the effect.

◆ The Europa Band

When using the receiver in an older German import automobile or looking at pictures of 1960s vintage small European transistor radios, you might've noticed the 49 meter band included along with MW (called AM here) and FM. At one time this "Europa band" was used by several European broadcasters as a means of extending their listener reach over the continent. (Perhaps you may have heard of Radio Luxembourg?) Curiously, a handful of German domestic broadcasters still do this.

German regionals on 49 meters include **DeutschlandRadio Berlin (DLR)** on 6005 kHz and **Deutschlandfunk (DLF)** on 6190 kHz; and **Bayerischer Rundfunk (BR)** from Munich on 6085 kHz. 6005 kHz is a crowded frequency making listenable reception an infrequent occurrence here despite **DLR's** 100 kW transmitter. It can often be heard underneath other stations sharing the frequency. **DLF** uses only 17kW on 6190, so the crowded conditions there make this one virtually impossible to hear. **BR's** 6085 has the distinct misfortune of being only 5 kHz down from Dr. Gene Scott's ubiquitous

Caribbean Beacon. But it does use 100kW and can be heard well on a receiver with good selectivity or a sync detector. It carries a mix of programming from **BR's** first (light music), second (variety) and fifth (information) networks, as well as the weekday overnight news service from **Mitteldeutscher Rundfunk (MDR)**, Leipzig (2300-0500UT).

However, the most readily heard of these stations during evenings in North America is the third network of **Sudwestrundfunk (SWR3)** on 7265 kHz (in the 41 meter band) originating from Rohrdorf. The 20kW signal isn't particularly strong, but the frequency is reasonably in the clear most of the night making it possible to enjoy the station's eurorock music format and pleasant-sounding German disk jockeys.

◆ Canada

Being nearby means stronger signals and a more familiar mixture. **CBC North Quebec** (1200-0600UT on 9625 kHz) is shortwave service for the high Arctic that carries programs from **CBC Radio One**, **SRC** (the French language domestic radio network) and locally produced programming in Inuktitut and Cree. On Canadian national holidays, one can listen to the entire day's schedule in English from **CBC Radio One**.

The **CBC** also uses shortwave on each coast (**CKZN**, St. John's and **CKZU**, Vancouver – both on 6160 kHz) to relay national and local programming. Despite their very low powered transmitters (1kW or less), these stations can be heard thousands of miles away around local dawn and dusk. Finally, the remarkably well heard **CFRX** (6070 kHz-1kW) relays the commercial news and talk formatted **CFRB** Toronto.

◆ Israel

Our last stop this month is the Middle East, where Israel relays its commercial **Reshet Bet** (Network B) around the clock to North America with powerful signals. Consult <http://www.israelradio.org> for current frequency information. Domestic news broadcasts in English are relayed from **Reshet Alef** (Network A) at 0400 and 1400UT. These are sometimes more informative than the newscasts specifically prepared for **Kol Israel**, the international service.

That's all that'll fit this month. Until May, good listening!



HOW TO USE THE SHORTWAVE GUIDE

0000-0100 twhfa USA, Voice of America 5995am 6130ca 7405am 9455af
 ① ② ⑤ ③ ④ ⑥ ⑦

Convert your time to UTC.

Broadcast time on ① and time off ② are expressed in Coordinated Universal Time (UTC) – the time at the 0 meridian near Greenwich, England. To translate your local time into UTC, first convert your local time to 24-hour format, then add (during Daylight Savings Time) 4, 5, 6, or 7 hours for Eastern, Central, Mountain or Pacific Times, respectively. Eastern, Central, and Pacific Times are already converted to UTC for you at the top of each page.

Note that all dates, as well as times, are in UTC; for example, a show which might air at 0030 UTC *Sunday* will be heard on *Saturday* evening in America (in other words, 8:30 pm Eastern, 7:30 pm Central, etc.).

Find the station you want to hear.

Look at the page which corresponds to the time you will be listening. On the top half of the page English broadcasts are listed by UTC time on ①, then alphabetically by country ③, followed by the station name ④. (If the station name is the same as the country, we don't repeat it, e.g., "Vanuatu, Radio" [Vanuatu].)

If a broadcast is not *daily*, the days of broadcast ⑤ will appear in the column following the time of broadcast, using the following codes:

Day Codes

| | |
|---------|-----------|
| s/S | Sunday |
| m/M | Monday |
| t/T | Tuesday |
| w/W | Wednesday |
| h/H | Thursday |
| f/F | Friday |
| a/A | Saturday |
| D | Daily |
| mon/MON | monthly |

In the same column ⑤, irregular broadcasts are indicated "tent" and programming which includes languages besides English are coded "vl" (various languages).

Choose the most promising frequencies for the time, location and conditions.

The frequencies ⑥ follow to the right of the station listing; all frequencies are listed in kilohertz (kHz). Not all listed stations will be heard from your location and virtually none of them will be heard all the time on all frequencies.

Shortwave broadcast stations change some of their frequencies at least twice a year, in April and October, to adapt to seasonal conditions. But they can also change in response to short-term conditions, interference, equipment prob-

lems, etc. Our frequency manager coordinates published station schedules with confirmations and reports from her monitoring team and MT readers to make the Shortwave Guide up-to-date as of one week before print deadline.

To help you find the most promising signal for your location, immediately following each frequency we've included information on the target area ⑦ of the broadcast. Signals beamed toward your area will generally be easier to hear than those beamed elsewhere, even though the latter will often still be audible.

Target Areas

| | |
|------|---|
| af: | Africa |
| al: | alternate frequency (occasional use only) |
| am: | The Americas |
| as: | Asia |
| au: | Australia |
| ca: | Central America |
| do: | domestic broadcast |
| eu: | Europe |
| irr: | irregular (Costa Rica RFPI) |
| me: | Middle East |
| na: | North America |
| om: | omnidirectional |
| pa: | Pacific |
| sa: | South America |
| va: | various |

Choose a program or station you want to hear.

Selected programs for prime listening hours appear following the frequencies – space does not permit 24 hour listings nor can every station be listed. However, listings for the most popular stations and selected lesser-known stations illustrate the variety available on shortwave. The format of the listings alternates among three different styles – by station, by genre and by day – month by month. Times listed are approximate and programs are subject to change.

The program listings emphasize broadcasts targeted to North America. In most cases, the stations and programs listed should be readily receivable in North America using a portable radio. Most broadcasters produce one broadcast in English per day that is repeated over a 24 hour period to all areas. If you are able to listen to transmissions to other areas of the world during "non-prime time" hours, referring to the prime time listings for those stations will likely be helpful in determining what programs will be broadcast.

Occasionally, a program or station listing may be followed by a reference to another listing for the same program or station at a different time. This is done to conserve space and make it possible to provide more listings.

MT MONITORING TEAM

Gayle Van Horn
Frequency Manager
gayle@webworkz.com

John Figlio
Program Manager
jfiglio1@nycap.rr.com

Mark Fine, VA
mark.fine@fineware-swl.com

Program Highlights

John Figlio

The Hitch-Hiker's Guide...

...to the Galaxy is back! The death last year of the writer Douglas Adams saddened millions of his fans. His comedy/science fiction series began life on the BBC's domestic radio, service and on **BBC World Service**, in 1978. It later became a book and a TV series. As a tribute to Douglas Adams, the World Service is repeating the series beginning in all streams on March 28 and continuing for 12 weeks. The best time to tune in on the Americas stream will be on Tuesdays, beginning April 2nd, at 0405UT. (With the switch to summer time the following Sunday, it will be broadcast at 0305 UT thereafter.)

Swiss Radio International

Yes, they're still not broadcasting to North America. However, it turns out that **SRI's** broadcasts in English to Africa, the Middle East and South America at 1730, 1930, 2000 and 2330 can be heard quite well here, especially in the eastern half of the continent. Therefore, program schedules for these broadcasts have been restored to the *MT SWG* in this issue.

VOA's Communications World ends

Dr. Kim Elliott, who began his career at the **VOA** in audience research, has decided to return there as of February 23rd. Consequently, the excellent series *Communications World* has come to an end.

The speculation here is that the **VOA**, in the aftermath of September 11, had become squeamish about producing the kind of program that inevitably must discuss broadcasting-related activities (like clandestine radio operations) that involve less transparent aspects of U.S. policy. For his part, being a journalist, Dr. Elliott could not consent to restrictions on his reporting and something had to give.

Of course I could be all wrong about this, so let me conclude by stating the obvious – that *Communications World* and Dr. Elliott will be sorely missed. We at *MT* thank him for his good work there and wish him all the best in his future endeavors.

0000 UTC - 8PM E / 7PM C / 5PM P

| | | | | | | |
|------|------|---------------------------------|---------|----------|----------|-----------------|
| 0000 | 0015 | Cambodia, National Radio Of | 11940as | | | |
| 0000 | 0015 | Japan, Radio 13650as | 17810as | | | |
| 0000 | 0030 | Australia, Radio | 9660pa | 12080pa | 15240as | 17580va 17750as |
| | | 17775pa 17795va | 21740va | | | |
| 0000 | 0030 | Egypt, Radio Cairo | 9900na | | | |
| 0000 | 0030 | Sri Lanka, SLBC | 4940do | | | |
| 0000 | 0030 | Thailand, Radio | 9655af | 9680af | 11905af | |
| 0000 | 0030 | UK, BBC World Service | 3915as | 5965as | 5975am | 6195as 7105as |
| | | 9410as 9915sa | 11945as | 11955as | 12095sa | 15280as 15310as |
| | | 15360as 17615as | 17790as | 17615as | 17790as | |
| 0000 | 0045 | India, All India Radio | 9705as | 9950as | 13605as | |
| 0000 | 0100 | Anguilla, Caribbean Beacon | 6090am | | | |
| 0000 | 0100 | Australia, ABC/Alice Springs | 4835do | | | |
| 0000 | 0100 | Australia, ABC/Katherine | 5025do | | | |
| 0000 | 0100 | Australia, ABC/Tennant Creek | 4910do | | | |
| 0000 | 0100 | Canada, CBC Northern Service | 9625do | | | |
| 0000 | 0100 | Canada, CFRX Toronto ON | 6070do | | | |
| 0000 | 0100 | Canada, CFVP Calgary AB | 6030do | | | |
| 0000 | 0100 | Canada, CHNX Halifax, NS | 6130do | | | |
| 0000 | 0100 | Canada, CKZN St John's NF | 6160do | | | |
| 0000 | 0100 | Canada, CKZU Vancouver BC | 6160do | | | |
| 0000 | 0100 | Canada, Radio Canada Intl | 9755na | 6175na | 9590na | 9750as |
| | | 11895as | | | | |
| 0000 | 0100 | Costa Rica, R for Peace Intl | 7455irr | 15040va | 21815usb | |
| 0000 | 0100 | Costa Rica, University Network | 5030am | 6150am | 7375am | 9724sa |
| | | 11870am 13749na | | | | |
| 0000 | 0100 | Ecuador, HCJB | 12035as | | | |
| 0000 | 0100 | Finland, Scandv Weekend Radio | 5980va | 11720va | | |
| 0000 | 0100 | Germany, Voice of Hope | 6040as | | | |
| 0000 | 0100 | Guyana, Voice of | 3290do | 5950do | | |
| 0000 | 0100 | Japan, Radio 6145na | | | | |
| 0000 | 0100 | Malaysia, Radio | 7295do | | | |
| 0000 | 0100 | Malaysia, RTM Kota Kinabalu | 5980do | | | |
| 0000 | 0100 | Malaysia, RTM Sarawak | 7160do | | | |
| 0000 | 0100 | Namibia, NBC | 3270af | 3290af | 7215irr | |
| 0000 | 0100 | Netherlands, Radio | 6165na | 9845na | | |
| 0000 | 0100 | New Zealand, Radio NZ Intl | 17675pa | | | |
| 0000 | 0100 | Papua New Guinea, NBC | 9675do | 11880irr | | |
| 0000 | 0100 | Russia, University Network | 9940as | | | |
| 0000 | 0100 | Singapore, SBC Radio One | 6150do | | | |
| 0000 | 0100 | Solomon Islands, SIBC | 5020do | 9545do | | |
| 0000 | 0100 | Spain, R Exterior Espana 6055na | | 9610as | | |
| 0000 | 0100 | Ukraine, R Ukraine Intl | 7420as | 6458usb | 12689usb | |
| 0000 | 0100 | USA, Armed Forces Radio | | | | |
| 0000 | 0100 | USA, KAJI Dallas TX | 5755va | | | |
| 0000 | 0100 | USA, KTBN Salt Lk City UT | 7510na | | | |
| 0000 | 0100 | USA, KWHR Naalehu HI 17510as | | | | |
| 0000 | 0100 | USA, Voice of America | 5995me | 6130am | 7405am | 9455am 9775am |
| | | 11695am 13790am | | | | |
| 0000 | 0100 | USA, WBCQ Monticello ME | 7415na | 9335na | 17495na | |
| 0000 | 0100 | USA, WEWN Birmingham AL | 5825na | 9355na | 15745na | |
| 0000 | 0100 | USA, WHRA Greenbush ME | 7580af | | | |
| 0000 | 0100 | USA, WHRI Noblesville IN | 5745va | 7315am | | |
| 0000 | 0100 | USA, WINB Red Lion PA 12160am | | | | |
| 0000 | 0100 | USA, WJCR Upton KY | 7490am | 13595as | | |
| 0000 | 0100 | USA, WRMI Miami FL | 9955am | | | |
| 0000 | 0100 | USA, WRMI Miami FL | 7385na | | | |
| 0000 | 0100 | USA, WRNO New Orleans LA | | 7355am | | |
| 0000 | 0100 | USA, WSHB Cyp Creek SC | 9430am | 15285sa | | |
| 0000 | 0100 | USA, WTJC Newport NC | 9370na | | | |
| 0000 | 0100 | USA, WWBS Macon GA 11900na | | | | |
| 0000 | 0100 | USA, WWCN Nashville TN | 3215na | 5070na | 7520na | 13845na |
| 0000 | 0100 | USA, WWRB Manchester TN | 5085va | 6890va | | |
| 0000 | 0100 | USA, WYFR Okeechobee FL | 6085na | 9505na | | |
| 0000 | 0100 | Vanuatu, Radio | 3945do | 4960do | 7260do | |
| 0000 | 0100 | Zambia, Christian Voice | 4965do | | | |
| 0005 | 0010 | Croatia, Croatian Radio | 9925sa | | | |
| 0030 | 0100 | Australia, Christian Voice Intl | | 21680as | | |
| 0030 | 0100 | Australia, Christian Voice Intl | | 17775as | 17850pa | |
| 0030 | 0100 | Australia, Radio | 9660pa | 12080pa | 15240as | 15415as 15415as |
| | | 17580va 17750as 17775pa | 21740va | | | |
| 0030 | 0100 | Iran, VO Islamic Rep. of Iran | 6065am | 6135na | | |
| 0030 | 0100 | Sri Lanka, SLBC | 4940do | 6005as | 9770as | 15425as |
| 0030 | 0100 | Thailand, Radio | 9655as | 11905as | 13695as | |
| 0030 | 0100 | UAE, AWR Africa | 6025as | 6055as | | |
| 0030 | 0100 | UK, BBC World Service | 5965as | 5975am | 6195as | 7105as 9410as |
| | | 11955as 12095sa | 15280as | 15310as | 15360as | 17790as |
| 0030 | 0100 | USA, VOA Special English | | 7215as | 9890as | 11760as 15185as |
| | | 15290as 17740as | 17820as | | | |
| 0030 | 0100 | USA, Voice of America | 5995me | 6015me | 6105me | 7215as 7265me |
| | | 9890as 11760as | 15185as | 15290as | 17740as | 17820as |
| 0030 | 0100 | USA, Voice of America | 5995me | 6015me | 6105me | 7265me |
| 0055 | 0100 | Italy, RAI Intl | 9675na | 11800na | | |

0100 UTC - 9PM E / 8PM C / 6PM P

| | | | | | | |
|------|------|---------------------------------|--------|---------|---------|---------|
| 0100 | 0115 | Italy, RAI Intl | 9675na | 11800na | | |
| 0100 | 0125 | Netherlands, Radio | 6165na | 9845na | | |
| 0100 | 0127 | Czech Rep, Radio Prague Intl | | 6200na | 7345na | |
| 0100 | 0127 | Vietnam, Voice of | 6175na | | | |
| 0100 | 0130 | Australia, Christian Voice Intl | | 17775as | 21550pa | 21680pa |
| 0100 | 0130 | Austria, AWR Europe | 6160as | | | |

| | | | | | | |
|------|------|--------------------------------|----------------|----------|----------|-----------------|
| 0100 | 0130 | Germany, Universal Life | 9435as | | | |
| 0100 | 0130 | Germany, Voice of Hope | 6040as | | | |
| 0100 | 0130 | Iran, VO Islamic Rep. of Iran | 6065am | 6135na | | |
| 0100 | 0130 | Slovakia, R Slovakia Intl | 5930na | 7230ca | 9440sa | |
| 0100 | 0130 | USA, Voice of America | 5995am | 6130am | 7405am | 9455am 9775am |
| | | 13790am | | | | |
| 0100 | 0130 | Uzbekistan, Radio Tashkent | 5955as | 5975as | 7215as | |
| 0100 | 0130 | Yugoslavia, Radio | 7115am | | | |
| 0100 | 0145 | Germany, Deutsche Welle | 9765na 11985na | 6040na | 6145am | 9640na 9700am |
| 0100 | 0156 | China, China Radio Intl | 9580na | 9790na | | |
| 0100 | 0156 | North Korea, Voice of | 6195as | 6520am | 7140as | 7580am 9345as |
| | | 11735am | | | | |
| 0100 | 0159 | Spain, R Exterior Espana | 6055na | | | |
| 0100 | 0200 | Anguilla, Caribbean Beacon | | 6090am | | |
| 0100 | 0200 | Australia, ABC/Katherine | | 5025do | | |
| 0100 | 0200 | Australia, ABC/Tennant Creek | | 4910do | | |
| 0100 | 0200 | Australia, Radio | 9660pa | 12080pa | 15240as | 15415as 17580va |
| | | 17750as 17775pa | 21725as | | | |
| 0100 | 0200 | Canada, CBC Northern Service | | 9625do | | |
| 0100 | 0200 | Canada, CFRX Toronto ON | | 6070do | | |
| 0100 | 0200 | Canada, CFVP Calgary AB | | 6030do | | |
| 0100 | 0200 | Canada, CHNX Halifax, NS | | 6130do | | |
| 0100 | 0200 | Canada, CKZN St John's NF | | 6160do | | |
| 0100 | 0200 | Canada, CKZU Vancouver BC | | 6160do | | |
| 0100 | 0200 | Costa Rica, R for Peace Intl | | 7455irr | 15040va | 21815usb |
| 0100 | 0200 | Costa Rica, University Network | | 5030am | 6150am | 7375am 9724sa |
| | | 11870am 13749na | | | | |
| 0100 | 0200 | Cuba, Radio Havana | 6000na | 9820na | 11705usb | |
| 0100 | 0200 | Ecuador, HCJB | 9745na | 11840na | 21455usb | |
| 0100 | 0200 | Finland, Scandv Weekend Radio | | 5980va | 11720va | |
| 0100 | 0200 | Guyana, Voice of | 3290do | 5950do | | |
| 0100 | 0200 | Hungary, Radio Budapest | | 9835na | | |
| 0100 | 0200 | Indonesia, Voice of | 9525pa | 11785as | 15150as | |
| 0100 | 0200 | Japan, Radio 11860pa | 11870as | 11880va | 17810as | 15325as 17685pa |
| | | 17835as 17845as | | | | |
| 0100 | 0200 | Malaysia, Radio | 7295do | | | |
| 0100 | 0200 | Malaysia, RTM Kota Kinabalu | | 5980do | | |
| 0100 | 0200 | Namibia, NBC | 3270af | 3290af | 7215irr | |
| 0100 | 0200 | New Zealand, Radio NZ Intl | | 17675pa | | |
| 0100 | 0200 | Papua New Guinea, NBC | | 9675do | 11880irr | |
| 0100 | 0200 | Russia, University Network | | 9940as | | |
| 0100 | 0200 | Russia, Voice of Russia | 7180na | 7250na | 9765na | 12020na 13665na |
| 0100 | 0200 | Singapore, SBC Radio One | | 6150do | | |
| 0100 | 0200 | Solomon Islands, SIBC | 5020do | 9545do | | |
| 0100 | 0200 | Sri Lanka, SLBC | 6005as | 9770as | 15425as | |
| 0100 | 0200 | UK, BBC World Service | 5965as | 5975am | 6195as | 9410as 9525ca |
| | | 9915sa 11955as 12095sa | 15280as | 15310as | 15360as | 17790as |
| 0100 | 0200 | USA, Armed Forces Radio | | 6458usb | | |
| 0100 | 0200 | USA, KAJI Dallas TX | 5755va | | | |
| 0100 | 0200 | USA, KTBN Salt Lk City UT | | 7510na | | |
| 0100 | 0200 | USA, KVOH Los Angeles CA | | 9975na | | |
| 0100 | 0200 | USA, KWHR Naalehu HI 17510as | | | | |
| 0100 | 0200 | USA, Voice of America | 5995me | 6015me | 6105me | 7115as 7200as |
| | | 7255me 9850as 11705as | 11820as | 15250as | 15300as | 17740as |
| | | 17820as | | | | |
| 0100 | 0200 | USA, WBCQ Monticello ME | | 7415na | 9335na | 17495na |
| 0100 | 0200 | USA, WEWN Birmingham AL | | 5825na | 9355na | 15745na |
| 0100 | 0200 | USA, WHRA Greenbush ME | | 7580af | | |
| 0100 | 0200 | USA, WHRI Noblesville IN | | 5745va | 7315am | |
| 0100 | 0200 | USA, WINB Red Lion PA 12160am | | | | |
| 0100 | 0200 | USA, WJCR Upton KY | | 7490am | 13595as | |
| 0100 | 0200 | USA, WRMI Miami FL | | 9955am | | |
| 0100 | 0200 | USA, WRMI Miami FL | | 7385na | | |
| 0100 | 0200 | USA, WRNO New Orleans LA | | 7355am | | |
| 0100 | 0200 | USA, WSHB Cyp Creek SC | | 9430na | 15285sa | |
| 0100 | 0200 | USA, WTJC Newport NC | | 9370na | | |
| 0100 | 0200 | USA, WWCN Nashville TN | | 3215na | 5070na | 5935na 7520na |
| 0100 | 0200 | USA, WWRB Manchester TN | | 5085va | 6890va | |
| 0100 | 0200 | USA, WYFR Okeechobee FL | | 6065na | 9505na | 15060as |
| 0100 | 0200 | Vanuatu, Radio | | 3945do | 4960do | 7260do |
| 0100 | 0200 | Zambia, Christian Voice | | 4965do | | |
| 0130 | 0145 | Libya, Voice of Africa | 15435irr | 17750irr | | |
| 0130 | 0200 | Austria, Christian Voice | 17645as | 21680pa | | |
| 0130 | 0200 | Iraq, Radio Iraq Intl | 7157irr | 9887irr | | |
| 0130 | 0200 | Sweden, Radio | 7290al | 9495as | | |
| 0130 | 0200 | UK, RTE Radio | 6155ca | | | |
| 0130 | 0200 | USA, VOA Special English | | 7405am | 9775am | 13740am |
| 0130 | 0200 | USA, Voice of America | 5995am | 6130am | 9455am | |
| 0140 | 0145 | Croatia, Croatian Radio | 9925sa | | | |
| 0140 | 0200 | Vatican City, Vatican Radio | | 7335au | 9650au | |
| 0145 | 0200 | Albania, Radio Tirana Intl | | 6110al | 6115na | 7160na |

0200 UTC - 10PM E / 9PM C / 7PM P

| | | | | | | |
|------|------|------------------------------|---------|---------|---------|----------------|
| 0200 | 0227 | Czech Rep, Radio Prague Intl | 6200na | 7345na | | |
| 0200 | 0230 | Belarus, Radio Belarus Intl | 5970eu | 7210eu | | |
| 0200 | 0230 | Germany, Voice of Hope | | 11785as | | |
| 0200 | 0230 | Myanmar, Radio | 7185do | | | |
| 0200 | 0230 | Yugoslavia, Radio | 7130am | | | |
| 0200 | 0245 | Germany, Deutsche Welle | | 7285as | 9615as | 9765as 11965as |
| 0200 | 0256 | North Korea, Voice of | 9325as | 11335as | | |
| 0200 | 0259 | Canada, Radio Canada Intl | | 6040am | 7235as | 9755am 11725am |
| | | 11990am 15150as | 17860as | | | |
| 0200 | 0300 | Anguilla, Caribbean Beacon | | 6090am | | |
| 0200 | 0300 | Argentina, RAE | | 6060am | 11710am | |

SELECTED PROGRAMMING BEGINS ON PAGE 55

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|------|------|-----------|---------------------------------|---------|----------|-----------------|-----------------|
| 0200 | 0300 | vi | Australia, ABC/Alice Springs | 4835do | | | |
| 0200 | 0300 | vi | Australia, ABC/Katherine | 5025do | | | |
| 0200 | 0300 | vi | Australia, ABC/Tennant Creek | 4910do | | | |
| 0200 | 0300 | | Australia, Christian Voice Intl | 21550as | 21680pa | | |
| 0200 | 0300 | | Australia, Radio | 9660pa | 12080pa | 15415as | 15515va |
| | | | 17580va 17750as 21725as | | | | |
| 0200 | 0300 | | Austria, Christian Voice | 17645as | 21680pa | | |
| 0200 | 0300 | | Bulgaria, Radio | 7400na | 9400na | | |
| 0200 | 0300 | | Canada, CBC Northern Service | 9625do | | | |
| 0200 | 0300 | | Canada, CFRX Toronto ON | 6070do | | | |
| 0200 | 0300 | | Canada, CFPV Calgary AB | 6030do | | | |
| 0200 | 0300 | | Canada, CHNX Halifax, NS | 6130do | | | |
| 0200 | 0300 | | Canada, CKZN St John's NF | 6160do | | | |
| 0200 | 0300 | | Canada, CKZU Vancouver BC | 6160do | | | |
| 0200 | 0300 | | Costa Rica, R for Peace Intl | 7455irr | 15040va | 21815usb | |
| 0200 | 0300 | | Costa Rica, University Network | 5030am | 6150am | 7375am | 9724sa |
| | | | 11870am 13749na 13749na | | | | |
| 0200 | 0300 | | Cuba, Radio Havana | 6000na | 9820na | 11705usb | |
| 0200 | 0300 | | Ecuador, HCJB | 9745na | 11840na | 21455usb | |
| 0200 | 0300 | | Egypt, Radio Cairo | 9475na | | | |
| 0200 | 0300 | a/monthly | Finland, Scandy Weekend Radio | 5990va | 11720va | | |
| 0200 | 0300 | | Guyana, Voice of | 3290do | 5950do | | |
| 0200 | 0300 | | Kenya, Kenya BC Corp | 4885irr | 4915irr | | |
| 0200 | 0300 | | Malaysia, Radio | 7295do | | | |
| 0200 | 0300 | | Malaysia, RTM Kota Kinabalu | 5980do | | | |
| 0200 | 0300 | | Namibia, NBC | 3270af | 3290af | 7215irr | |
| 0200 | 0300 | | New Zealand, Radio NZ Intl | 17675pa | | | |
| 0200 | 0300 | vi | Papua New Guinea, NBC | 9675do | 11880irr | | |
| 0200 | 0300 | | Romania, R Romania Intl | 9550na | 11740na | 11830na | 11940va |
| | | | 15290as 15370pa | | | | |
| 0200 | 0300 | | Russia, University Network | 9940as | | | |
| 0200 | 0300 | | Russia, Voice of Russia | 7180na | 7335na | 12020na | 13665na |
| 0200 | 0300 | vi | Singapore, SBC Radio One | 6150do | | | |
| 0200 | 0300 | | Solomon Islands, SIBC | 9545do | | | |
| 0200 | 0300 | | South Korea, R Korea Intl | 7275na | 9560na | 11725sa | 11810sa |
| | | | 15575na | | | | |
| 0200 | 0300 | | Sri Lanka, SLBC | 6005as | 6130do | 9770as | 15425as |
| 0200 | 0300 | | Taiwan, R Taipei Intl | 15320na | 15465na | | |
| 0200 | 0300 | | Taiwan, R Taipei Intl | 5950na | 9680na | 11740ca | 15320as 15345as |
| 0200 | 0300 | | UK, BBC World Service | 5975am | 9410me | 9525ca | 9770af 9915sa |
| | | | 11955as 12095sa 15280as | | 15310as | 15360as 17790as | |
| 0200 | 0300 | | USA, Armed Forces Radio | 6458usb | 12689usb | | |
| 0200 | 0300 | | USA, KAJI Dallas TX | 5755va | | | |
| 0200 | 0300 | | USA, KJES Vado NM | 7555na | | | |
| 0200 | 0300 | | USA, KTVN Salt Lk City UT | 7510na | | | |
| 0200 | 0300 | | USA, KVOH Los Angeles CA | 9975na | | | |
| 0200 | 0300 | | USA, KWHR Naalehu HI | 17510as | | | |
| 0200 | 0300 | | USA, Voice of America | 5995me | 6015me | 6105me | 7115as 7200as |
| | | | 7255me 9850as 11705as | 11820as | 15250as | 15300as | 17740as |
| | | | 17820as | | | | |
| 0200 | 0300 | | USA, WBCQ Monticello ME | 7415na | 9335na | | |
| 0200 | 0300 | | USA, WEWN Birmingham AL | 5825na | 9355na | 15745na | |
| 0200 | 0300 | | USA, WHRA Greenbush ME | 7580af | | | |
| 0200 | 0300 | | USA, WHRI Noblesville IN | 5745va | 7315am | | |
| 0200 | 0300 | | USA, WINB Red Lion PA | 12160am | | | |
| 0200 | 0300 | | USA, WJCR Upton KY | 7490am | 13595as | | |
| 0200 | 0300 | s m | USA, WRMI Miami FL | 9955am | | | |
| 0200 | 0300 | twfha | USA, WRMI Miami FL | 7385na | | | |
| 0200 | 0300 | | USA, WRNO New Orleans LA | 7355am | | | |
| 0200 | 0300 | | USA, WSHB Cyp Creek SC | 7535am | 9430na | | |
| 0200 | 0300 | | USA, WTJC Newport NC | 9370na | | | |
| 0200 | 0300 | | USA, WWCR Nashville TN | 3215na | 5070na | 5935na | 7520na |
| 0200 | 0300 | | USA, WWRB Manchester TN | 5085va | 6890va | | |
| 0200 | 0300 | | USA, WYFR Okeechobee FL | 6065na | 9505na | | |
| 0200 | 0300 | vi | Vanuatu, Radio | 3945do | 4960do | 7260do | |
| 0200 | 0300 | | Zambia, Christian Voice | 4965do | | | |
| 0200 | 1215 | | Cambodia, National Radio Of | 11940as | | | |
| 0205 | 0210 | | Croatia, Croatian Radio | 9925na | | | |
| 0215 | 0220 | | Nepal, Radio3230as | 5005as | | | |
| 0230 | 0257 | | Vietnam, Voice of | 6175na | | | |
| 0230 | 0300 | | Albania, Radio Tirana Intl | 6110al | 6115na | 7160na | |
| 0230 | 0300 | | Austria, Radio Austria Intl | 7325na | | | |
| 0230 | 0300 | mtwhfa | Hungary, Radio Budapest | 9835na | | | |
| 0230 | 0300 | as | Philippines, Radio Pilipinas | 12015me | 15120me | 15270me | |
| 0230 | 0300 | | Slovakia, AWR | 7235as | | | |
| 0230 | 0300 | | Sweden, Radio | 6020al | 9495na | | |
| 0250 | 0300 | | Vatican City, Vatican Radio | 7305am | 9605am | | |

0300 UTC - 11PM E / 10PM C / 8PM P

| | | | | | | | |
|------|------|---------|------------------------------|---------|---------|---------|--------|
| 0300 | 0310 | | Vatican City, Vatican Radio | 7305am | 9605am | | |
| 0300 | 0325 | | Belgium, RVI Flanders R Intl | 11985na | | | |
| 0300 | 0330 | | Egypt, Radio Cairo | 9475na | | | |
| 0300 | 0330 | s twfha | Mexico, Radio Mexico Intl | 9705am | 11770am | | |
| 0300 | 0330 | | S Africa, Channel Africa | 9525af | | | |
| 0300 | 0330 | | Thailand, Radio | 9655am | 11905am | 15460na | |
| 0300 | 0330 | a | UK, Wales Radio Intl | 9795na | | | |
| 0300 | 0330 | | USA, KJES Vado NM | 7555na | | | |
| 0300 | 0330 | | USA, KVOH Los Angeles CA | 9975na | | | |
| 0300 | 0330 | mtwhf | USA, Voice of America | 4960af | | | |
| 0300 | 0345 | | Germany, Deutsche Welle | 6020na | 6045na | 9640am | 9700na |
| | | | 9765na 11985na 14505na | | | | |
| 0300 | 0350 | | Turkey, Voice of | 6020na | 7240va | | |
| 0300 | 0356 | | China, China Radio Intl | 9690na | | | |
| 0300 | 0356 | | North Korea, Voice of | 6195as | 7140as | 9345as | |
| 0300 | 0400 | | Anguilla, Caribbean Beacon | | 6090am | | |
| 0300 | 0400 | vl | Australia, ABC/Alice Springs | 4835do | | | |
| 0300 | 0400 | vl | Australia, ABC/Katherine | 5025do | | | |
| 0300 | 0400 | vl | Australia, ABC/Tennant Creek | 4910do | | | |

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|------|------|-----------|---------------------------------|----------|----------|----------|-----------------|
| 0300 | 0400 | | Australia, Christian Voice Intl | 21550as | 21680pa | | |
| 0300 | 0400 | | Australia, Radio 9660pa | 12080pa | 15240as | 15415as | 15515va |
| | | | 17580va 17750as 21725as | | | | |
| 0300 | 0400 | | Austria, Christian Voice | 21680pa | | | |
| 0300 | 0400 | vi | Botswana, Radio | 3356do | 7255do | | |
| 0300 | 0400 | | Canada, CBC Northern Service | 9625do | | | |
| 0300 | 0400 | | Canada, CFRX Toronto ON | 6070do | | | |
| 0300 | 0400 | | Canada, CFPV Calgary AB | 6030do | | | |
| 0300 | 0400 | | Canada, CHNX Halifax, NS | 6130do | | | |
| 0300 | 0400 | | Canada, CKZN St John's NF | 6160do | | | |
| 0300 | 0400 | | Canada, CKZU Vancouver BC | 6160do | | | |
| 0300 | 0400 | | Costa Rica, R for Peace Intl | 7455irr | 15040va | | |
| 0300 | 0400 | | Costa Rica, University Network | 5030am | 6150am | 7375am | 9724scs |
| | | | 11870am 13749na 17645as | | | | |
| 0300 | 0400 | | Cuba, Radio Havana | 6000na | 9820na | 11705usb | |
| 0300 | 0400 | | Ecuador, HCJB | 9745na | 11840na | 21455usb | |
| 0300 | 0400 | a/monthly | Finland, Scandy Weekend Radio | 5990va | 11720va | | |
| 0300 | 0400 | vi | Guatemala, Radio Cultural | 3300do | 5955do | | |
| 0300 | 0400 | | Guyana, Voice of | 3290do | | | |
| 0300 | 0400 | | Japan, Radio 17825ca | | | | |
| 0300 | 0400 | vi | Kenya, Kenya BC Corp | 4885irr | 4915irr | | |
| 0300 | 0400 | | Lesotho, Radio | 4800do | | | |
| 0300 | 0400 | | Malaysia, Radio | 7295do | | | |
| 0300 | 0400 | | Malaysia, Voice of | 6175as | 9750as | 15295pa | |
| 0300 | 0400 | | Namibia, NBC | 3270af | 3290af | 7215irr | |
| 0300 | 0400 | | New Zealand, Radio NZ Intl | 17675pa | | | |
| 0300 | 0400 | | Oman, Radio | 15355va | | | |
| 0300 | 0400 | vi | Papua New Guinea, NBC | 9675do | 11880irr | | |
| 0300 | 0400 | as | Philippines, Radio Pilipinas | 12015me | 15120me | 15270me | |
| 0300 | 0400 | | Russia, University Network | 17765as | | | |
| 0300 | 0400 | | Russia, Voice of Russia | 7125na | 7180na | 7330na | 12010na 12020na |
| | | | 13665na 15595na 17595na | | | | |
| 0300 | 0400 | | Singapore, SBC Radio One | 6150do | | | |
| 0300 | 0400 | vi | Solomon Islands, SIBC | 5020do | 9545do | | |
| 0300 | 0400 | | Sri Lanka, SLBC | 6005as | 9770as | 15425as | |
| 0300 | 0400 | | Taiwan, R Taipei Intl | 5950na | 9680na | 11875as | 15320as |
| 0300 | 0400 | | Uganda, Radio | 5026do | 7196do | | |
| 0300 | 0400 | | UK, BBC World Service | 3255af | 5975am | 6005af | 6190af 6195eu |
| | | | 7160af 9410eu 9525ca | 11730af | 11765af | 12035af | 12095me |
| | | | 15280as 15310as 15360as | 15575me | 17760as | 17790as | 21660as |
| | | | 21830as | | | | |
| 0300 | 0400 | | Ukraine, R Ukraine Intl | 7285as | 7375as | 7420as | 9610as |
| 0300 | 0400 | | USA, Armed Forces Radio | | 6458usb | 12689usb | |
| 0300 | 0400 | | USA, KAIJ Dallas TX | 5755va | | | |
| 0300 | 0400 | | USA, KTBN Salt Lk City UT | | 7510na | | |
| 0300 | 0400 | | USA, KWHR Naalehu HI | 17510as | | | |
| 0300 | 0400 | | USA, Voice of America | 6035af | 6080af | 7105af | 7290af 7340af |
| | | | 7415af 9575af 9885af | | | | |
| 0300 | 0400 | | USA, WBQC Monticello ME | | 7415na | 9335na | |
| 0300 | 0400 | | USA, WEWN Birmingham AL | | 5825na | 7425na | 15745na |
| 0300 | 0400 | | USA, WHRA Greenbush ME | | 7580af | | |
| 0300 | 0400 | | USA, WHRI Noblesville IN | | 5745va | 7315am | |
| 0300 | 0400 | | USA, WINB, Red Lion PA | | 12160am | | |
| 0300 | 0400 | | USA, WJCR Upton KY | 7490am | 13595as | | |
| 0300 | 0400 | | USA, WMLK Bethel PA | 9465eu | | | |
| 0300 | 0400 | twfha | USA, WRMI Miami FL | 7385na | | | |
| 0300 | 0400 | | USA, WRNO New Orleans LA | | 7395am | | |
| 0300 | 0400 | | USA, WSHB Cyp Creek SC | | 7535eu | | |
| 0300 | 0400 | | USA, WTJC Newport NC | | 9370na | | |
| 0300 | 0400 | | USA, WWCR Nashville TN | | 3215na | 5070na | 5935na 7520na |
| 0300 | 0400 | | USA, WWRB Manchester TN | | 5085va | 6890va | |
| 0300 | 0400 | | USA, WYFR Okeechobee FL | | 6065na | 9505na | |
| 0300 | 0400 | vi | Vanuatu, Radio | 3945do | 4960do | 7260do | |
| 0300 | 0400 | | Zambia, Christian Voice | 6065do | | | |
| 0300 | 0400 | vi | Zimbabwe, Zimbabwe BC Corp | 4828do | 6045do | | |
| 0310 | 0340 | | Vatican City, Vatican Radio | 9660af | | | |
| 0330 | 0345 | vi | Libya, Voice of Africa | 15435irr | 17750irr | | |
| 0330 | 0350 | | UAE, Emirates Radio | 12005na | 13675na | 15395na | 15435na |
| 0330 | 0357 | | Vietnam, Voice of | 6175na | | | |
| 0330 | 0400 | | Myanmar, Radio | 9730do | | | |
| 0330 | 0400 | | Sweden, Radio | 9495na | 9755al | | |
| 0330 | 0400 | | UAE, AWR Africa | 11795as | | | |
| 0340 | 0345 | | Croatia, Croatian Radio | | 9925na | | |
| 0345 | 0400 | f | Seychelles, FEBA Radio | 11885af | | | |
| 0345 | 0400 | | Tajikistan, Radio | 7245as | | | |

0400 UTC - 12AM E / 11PM C / 9PM P

| | | | | | | | | |
|------|------|---------|---------------------------------|---------|---------|---------|---------|---------|
| 0400 | 0415 | | Israel, Kol Israel | 6280va | 9435va | 17545va | | |
| 0400 | 0427 | | Czech Rep, Radio Prague Intl | | 7345na | 7385na | 9435na | |
| 0400 | 0430 | mtwhf | France Radio France Intl | 11910af | 11995af | | | |
| 0400 | 0430 | vi | Guatemala, Radio Cultural | | 3300do | 5955do | | |
| 0400 | 0430 | s twhta | Mexico, Radio Mexico Intl | | 9705am | 11770am | | |
| 0400 | 0430 | vi | Nigeria, Radio/Kaduna | 6090do | 7275do | | | |
| 0400 | 0430 | | S Africa, AWR Africa | 9650af | | | | |
| 0400 | 0430 | | S Africa, Channell Africa | 5955af | | | | |
| 0400 | 0430 | | Sri Lanka, SLBC | 6005as | 9770as | 15425as | | |
| 0400 | 0445 | | Germany, Deutsche Welle | | 6015af | 7195af | 9565af | 9710af |
| 0400 | 0445 | | USA, WYFR Okeechobee FL | | 6065na | 9505na | 9985eu | 11550eu |
| 0400 | 0456 | | China, China Radio Intl | 9560na | | | | |
| 0400 | 0500 | | Anguilla, Caribbean Beacon | | 6090am | | | |
| 0400 | 0500 | vi | Australia, ABC/Alice Springs | | 4835do | | | |
| 0400 | 0500 | vi | Australia, ABC/Katherine | | 5025do | | | |
| 0400 | 0500 | vi | Australia, ABC/Tennant Creek | | 4910do | | | |
| 0400 | 0500 | | Australia, Christian Voice Intl | | 21550as | | | |
| 0400 | 0500 | | Australia, Radio | 9660pa | 12080pa | 15240as | 15415as | 15515va |
| | | | 17580va | 17750as | 21725as | | | |
| 0400 | 0500 | vi | Botswana, Radio | 3356do | 4820do | 7255do | | |
| 0400 | 0500 | vi | Cameroon, RTV | 4850do | 6005do | | | |

Shortwave Guide



| | | | | | | | |
|------|------|---------------------------------|---------|----------|----------|---------|---------|
| 0400 | 0500 | Canada, CBC Northern Service | 9625do | | | | |
| 0400 | 0500 | Canada, CFRX Toronto ON | 6070do | | | | |
| 0400 | 0500 | Canada, CFVP Calgary AB | 6030do | | | | |
| 0400 | 0500 | Canada, CHNX Halifax, NS | 6130do | | | | |
| 0400 | 0500 | Canada, CKZN St John's NF | 6160do | | | | |
| 0400 | 0500 | Canada, CKZU Vancouver BC | 6160do | | | | |
| 0400 | 0500 | Costa Rica, R for Peace Intl | 7455irr | 15040va | | | |
| 0400 | 0500 | Costa Rica, University Network | 5030am | 6150am | 7375am | 9724sa | |
| | | 11870am 13749na | 17645as | | | | |
| 0400 | 0500 | Cuba, Radio Havana | 6000na | 9820na | 11705usb | | |
| 0400 | 0500 | Ecuador, HCJB | 9745na | 11840na | 21455usb | | |
| 0400 | 0500 | Finland, Scandv Weekend Radio | 5990va | 11720va | | | |
| 0400 | 0500 | Guyana, Voice of | 3290do | | | | |
| 0400 | 0500 | Kenya, Kenya BC Corp | 4885irr | 4915irr | | | |
| 0400 | 0500 | Lesotho, Radio | 4800do | | | | |
| 0400 | 0500 | Malaysia, Radio | 7295do | | | | |
| 0400 | 0500 | Malaysia, Voice of | 6175as | 9750as | 15295pa | | |
| 0400 | 0500 | Myanmar, Radio | 9730do | | | | |
| 0400 | 0500 | Namibia, NBC | 3270af | 3290af | 7215irr | | |
| 0400 | 0500 | New Zealand, Radio NZ Intl | 15340pa | | | | |
| 0400 | 0500 | Nigeria, Radio/Enugu | 6025do | | | | |
| 0400 | 0500 | Papua New Guinea, NBC | 9675do | 11880irr | | | |
| 0400 | 0500 | Romania, R Romania Intl | 9550na | 11830na | 15335as | 17735as | |
| 0400 | 0500 | Russia, University Network | 17765as | | | | |
| 0400 | 0500 | Russia, Voice of Russia | 7125na | 7180na | 7330na | 12010na | 12020na |
| | | 15595na 17595na | | | | | |
| 0400 | 0500 | Singapore, SBC Radio One | 6150do | | | | |
| 0400 | 0500 | Solomon Islands, SIBC | 5020do | | | | |
| 0400 | 0500 | Uganda, Radio | 5026do | | | | |
| 0400 | 0500 | UK, BBC World Service | 3255af | 5975am | 6005af | 6135ca | 6190af |
| | | 6195eu 7160af 9410eu | 11765af | 12035af | 12095me | 15280as | |
| | | 15310as 15420af 15575me | 17760as | 17790as | 21660as | 21830as | |
| 0400 | 0500 | USA, Armed Forces Radio | 6458usb | 12689usb | | | |
| 0400 | 0500 | USA, KAU Dallas TX | 5755va | | | | |
| 0400 | 0500 | USA, KTBN Salt Lk City UT | 7510na | | | | |
| 0400 | 0500 | USA, KWHR Naalehu HI 17780as | | | | | |
| 0400 | 0500 | USA, Voice of America | 6080af | 7170af | 7290af | 7415af | 9575af |
| | | 9775af 9885af 15205as | | | | | |
| 0400 | 0500 | USA, WBCQ Monticello ME | 7415na | 9335na | | | |
| 0400 | 0500 | USA, WEWN Birmingham AL | 5825na | 7425na | 15745na | | |
| 0400 | 0500 | USA, WHRA Greenbush ME | 7580af | | | | |
| 0400 | 0500 | USA, WHRI Noblesville IN | 5745va | 7315am | | | |
| 0400 | 0500 | USA, WINB, Red Lion PA | 12160am | | | | |
| 0400 | 0500 | USA, WJCR Upton KY | 7490am | 13595as | | | |
| 0400 | 0500 | USA, WMLK Bethel PA | 9465eu | | | | |
| 0400 | 0500 | USA, WRMI Miami FL | 7385na | | | | |
| 0400 | 0500 | USA, WSHB Cyp Creek SC | 7535eu | 12020af | | | |
| 0400 | 0500 | USA, WTJC Newport NC | 9370na | | | | |
| 0400 | 0500 | USA, WWCN Nashville TN | 3215na | 5070na | 5935na | 7560na | |
| 0400 | 0500 | USA, WWRB Manchester TN | 5085va | 6890va | | | |
| 0400 | 0500 | Zambia, Christian Voice | 6065do | | | | |
| 0400 | 0500 | Zimbabwe, Zimbabwe BC Corp | 4828do | 6045do | | | |
| 0405 | 0410 | Croatia, Croatian Radio 7285na | 9925na | | | | |
| 0427 | 0500 | Liberia, Voice of Hope | 12060af | | | | |
| 0430 | 0457 | Czech Rep, Radio Prague Intl | 9865va | 11600va | | | |
| 0430 | 0500 | Australia, Christian Voice Intl | 21680pa | | | | |
| 0430 | 0500 | Italy, IRRS 3980al | 3985va | | | | |
| 0430 | 0500 | Netherlands, Radio | 6165na | 9590na | | | |
| 0430 | 0500 | Nigeria, Radio/Ibadan | 6050do | | | | |
| 0430 | 0500 | Nigeria, Radio/Kaduna | 4770do | 6090do | 7275do | 9570do | |
| 0430 | 0500 | Nigeria, Radio/Lagos | 3326do | | | | |
| 0430 | 0500 | S Africa, AWR Africa | 12080af | | | | |
| 0430 | 0500 | Swaziland, TWR | 4775af | 6035af | | | |
| 0445 | 0500 | Italy, RAI Intl 5965af | 7235af | | | | |

0500 UTC - 1AM E / 12AM C / 10PM P

| | | | | | | | |
|------|------|----------------------------------|---------|---------|----------|---------|---------|
| 0500 | 0515 | Canada, CBC Northern Service | 9625do | | | | |
| 0500 | 0515 | Zambia, National BC Corp | 6265do | | | | |
| 0500 | 0520 | Vatican City, Vatican Radio | 4005eu | 5885eu | 7250eu | | |
| 0500 | 0525 | Liberia, Voice of Hope | 15320af | | | | |
| 0500 | 0530 | France Radio France Intl 13610af | 15155af | | | | |
| 0500 | 0530 | Netherlands, Radio | 6165na | 9590na | | | |
| 0500 | 0530 | S Africa, AWR Africa | 5960af | 6015af | | | |
| 0500 | 0530 | S Africa, Channel Africa 15215af | | | | | |
| 0500 | 0530 | Vatican City, Vatican Radio | 9660af | 11625af | 15570af | | |
| 0500 | 0530 | Zimbabwe, Zimbabwe BC Corp | 4828do | 6045do | | | |
| 0500 | 0545 | Germany, Deutsche Welle | 5960na | 6120na | 6140eu | 9670na | |
| | | 11795na | | | | | |
| 0500 | 0600 | Anguilla, Caribbean Beacon | 6090am | | | | |
| 0500 | 0600 | Australia, ABC/Alice Springs | 4835do | | | | |
| 0500 | 0600 | Australia, ABC/Katherine | 5025do | | | | |
| 0500 | 0600 | Australia, ABC/Tennant Creek | 4910do | | | | |
| 0500 | 0600 | Australia, Christian Voice Intl | 21550as | 21680pa | | | |
| 0500 | 0600 | Australia, Radio | 9660pa | 12080pa | 15240as | 15415as | 15515va |
| | | 17580va 17750as 21725as | | | | | |
| 0500 | 0600 | Bhutan, Bhutan BC Service | 5030al | 6035do | | | |
| 0500 | 0600 | Botswana, Radio | 4820do | 7255do | | | |
| 0500 | 0600 | Cameroon, RTV | 4850do | | | | |
| 0500 | 0600 | Canada, CFRX Toronto ON | 6070do | | | | |
| 0500 | 0600 | Canada, CFVP Calgary AB | 6030do | | | | |
| 0500 | 0600 | Canada, CHNX Halifax, NS | 6130do | | | | |
| 0500 | 0600 | Canada, CKZN St John's NF | 6160do | | | | |
| 0500 | 0600 | Canada, CKZU Vancouver BC | 6160do | | | | |
| 0500 | 0600 | Costa Rica, R for Peace Intl | 7455irr | 15040va | | | |
| 0500 | 0600 | Costa Rica, University Network | 5030am | 6150am | 7375am | 9724sa | |
| | | 11870am 13749na | 17645as | | | | |
| 0500 | 0600 | Cuba, Radio Havana | 9550na | 9820na | 9830usb | | |
| 0500 | 0600 | Ecuador, HCJB | 9745na | 11840na | 21455usb | | |

| | | | | | | | |
|------|------|-----------|--------------------------------|---------|----------|---------|-----------------|
| 0500 | 0600 | a/monthly | Finland, Scandv Weekend Radio | 5990va | 11720va | | |
| 0500 | 0600 | | Guyana, Voice of | 3290do | 5950do | | |
| 0500 | 0600 | | Japan, Radio 5975eu | 6110na | 7230eu | 9835na | 11715eu 11760eu |
| | | | 15195as 17810as | 21755pa | | | |
| 0500 | 0600 | | Kenya, Kenya BC Corp | 4885irr | 4915irr | | |
| 0500 | 0600 | | Kuwait, Radio | 15110as | | | |
| 0500 | 0600 | vi | Lesotho, Radio | 4800do | | | |
| 0500 | 0600 | | Malaysia, Radio | 7295do | | | |
| 0500 | 0600 | | Malaysia, RTM Sarawak | 7160do | | | |
| 0500 | 0600 | | Malaysia, Voice of | 6175as | 9750as | 15295pa | |
| 0500 | 0600 | | Myanmar, Radio | 9730do | | | |
| 0500 | 0600 | | Namibia, NBC | 3270af | 3290af | 7215irr | |
| 0500 | 0600 | | New Zealand, Radio NZ Intl | 15340pa | | | |
| 0500 | 0600 | vi | Nigeria, Radio/Enugu | 6025do | | | |
| 0500 | 0600 | vi | Nigeria, Radio/Ibadan | 6050do | | | |
| 0500 | 0600 | vi | Nigeria, Radio/Kaduna | 4770do | 6090do | 7275do | 9570do |
| 0500 | 0600 | vi | Nigeria, Radio/Lagos | 3326do | 4990do | | |
| 0500 | 0600 | | Nigeria, Voice of | 7255af | 11770af | 15120va | |
| 0500 | 0600 | vi | Papua New Guinea, NBC | 9675do | 11880irr | | |
| 0500 | 0600 | | Russia, University Network | 17765as | | | |
| 0500 | 0600 | | Russia, Voice of Russia | 11770au | 12010au | 15275au | 15470au 17655au |
| | | | 17665au 21485au 21790au | | | | |
| 0500 | 0600 | | Singapore, SBC Radio One | 6150do | | | |
| 0500 | 0600 | vi | Solomon Islands, SIBC | 5020do | 9545do | | |
| 0500 | 0600 | | Spain, R Exterior Espana | 6055na | | | |
| 0500 | 0600 | | Swaziland, TWR | 6035af | 7205af | 9500af | |
| 0500 | 0600 | | Uganda, Radio | 5026do | 7196do | | |
| 0500 | 0600 | | UK, BBC World Service | 6005af | 6135ca | 6190af | 7160af |
| | | | 9410eu 11760me 11765af | 11940af | 11955as | 15280as | 15310as |
| | | | 15360as 15420af 15575as | 17640af | 17760as | 17790as | 17885af |
| | | | 21660as | | | | |
| 0500 | 0600 | | USA, Armed Forces Radio | 6458usb | 12689usb | | |
| 0500 | 0600 | | USA, KAU Dallas TX | 5755va | | | |
| 0500 | 0600 | | USA, KTBN Salt Lk City UT | 7510na | | | |
| 0500 | 0600 | | USA, KWHR Naalehu HI 17780as | | | | |
| 0500 | 0600 | mtwhf | USA, KWHR Naalehu HI 11565pa | | | | |
| 0500 | 0600 | | USA, Voice of America | 5970af | 6035af | 6080af | 7170af 7295af |
| | | | 9700af 11825eu 11835af | 13710af | 15205as | | |
| 0500 | 0600 | | USA, WBCQ Monticello ME | 7415na | 9335na | | |
| 0500 | 0600 | | USA, WEWN Birmingham AL | 5825na | 7425na | 15745na | |
| 0500 | 0600 | | USA, WHRA Greenbush ME | 7580af | | | |
| 0500 | 0600 | | USA, WHRI Noblesville IN | 5745va | 7315am | | |
| 0500 | 0600 | | USA, WJCR Upton KY | 7490am | 13595as | | |
| 0500 | 0600 | | USA, WMLK Bethel PA | 9465eu | | | |
| 0500 | 0600 | twhta | USA, WRMI Miami FL | 7385na | | | |
| 0500 | 0600 | | USA, WRNO New Orleans LA | 7395am | | | |
| 0500 | 0600 | | USA, WSHB Cyp Creek SC | 7535eu | 12020af | | |
| 0500 | 0600 | | USA, WTJC Newport NC | 9370na | | | |
| 0500 | 0600 | | USA, WWCN Nashville TN | 3215na | 5070na | 5935na | 7560na |
| 0500 | 0600 | | USA, WWRB Manchester TN | 5085va | 6890va | | |
| 0500 | 0600 | | USA, WYFR Okeechobee FL | 5810eu | | | |
| 0500 | 0600 | vi | Vanuatu, Radio | 3945do | 4960do | 7260do | |
| 0500 | 0600 | | Zambia, Christian Voice | 6065do | | | |
| 0525 | 0600 | vi | Ghana, Ghana BC Corp | 3366do | 4915do | | |
| 0530 | 0550 | | UAE, Emirates Radio | 15435au | 17830au | 21695au | |
| 0530 | 0600 | | S Africa, AWR Africa | 15345af | | | |
| 0530 | 0600 | | Thailand, Radio | 9655eu | 11905eu | 13780eu | |
| 0530 | 0600 | mtwhf | UK, BBC World Service | 17885af | | | |
| 0530 | 0600 | vi | Zimbabwe, Zimbabwe BC Corp | 5975do | 6045do | | |
| 0540 | 0545 | | Croatia, Croatian Radio 7285na | 9925na | | | |

0600 UTC - 2AM E / 1AM C / 11PM P

| | | | | | | | |
|------|------|-------|----------------------------------|---------|---------|---------|-----------------|
| 0600 | 0630 | mtwhf | France Radio France Intl 11710af | 15155af | | | |
| 0600 | 0630 | | S Africa, AWR Africa | 15345af | | | |
| 0600 | 0630 | | S Africa, Channel Africa | 15215af | | | |
| 0600 | 0630 | | S Africa, TWR | 15345af | | | |
| 0600 | 0630 | | USA, Voice of America | 5970af | 6035af | 6080af | 7170af 7295af |
| | | | 11825eu 11825af 11915me | 11930af | 11995af | 12025af | 13710af |
| | | | 15205as 15335me | | | | |
| 0600 | 0645 | | Germany, Deutsche Welle | 7225af | 9565af | 11785af | |
| 0600 | 0700 | | Anguilla, Caribbean Beacon | 6090am | | | |
| 0600 | 0700 | vi | Australia, ABC/Alice Springs | 4835do | | | |
| 0600 | 0700 | vi | Australia, ABC/Katherine | 5025do | | | |
| 0600 | 0700 | vi | Australia, ABC/Tennant Creek | 4910do | | | |
| 0600 | 0700 | | Australia, Christian Voice Intl | 21550as | 21680pa | | |
| 0600 | 0700 | | Australia, Radio | 9660pa | 12080pa | 15240as | 15415as 15515va |
| | | | 17580va 17750as 21725as | | | | |
| 0600 | 0700 | vi | Botswana, Radio | 7255do | 9600do | | |
| 0600 | 0700 | vi | Cameroon, RTV | 4850do | 6005do | | |
| 0600 | 0700 | | Canada, CFRX Toronto ON | 6070do | | | |
| 0600 | 0700 | | Canada, CFVP Calgary AB | 6030do | | | |
| 0600 | 0700 | | Canada, CHNX Halifax, NS | 6130do | | | |
| 0600 | 0700 | | Canada, CKZN St John's NF | 6160do | | | |
| 0600 | 0700 | | Canada, CKZU Vancouver BC | 6160do | | | |
| 0600 | 0700 | | Costa Rica, R for Peace Intl | 7455irr | 15040va | | |
| 0600 | 0700 | | Costa Rica, University Network | 5030am | 6150am | 7375am | 972 |

Shortwave Guide



| | | | | | | | |
|------|--------|--------|-----------------------------|----------|---------|-----------|-----------------|
| 0600 | 0700 | | Liberia, R Liberia Intl | 6100do | | | |
| 0600 | 0700 | | Malaysia, Radio | 7295do | | | |
| 0600 | 0700 | | Malaysia, RTM Sarawak | 7160do | | | |
| 0600 | 0700 | | Malaysia, Voice of | 6175as | 9750as | 15295pa | |
| 0600 | 0700 | | Myanmar, Radio | 9730do | | | |
| 0600 | 0700 | | Namibia, NBC | 3270af | 3290af | 7215sirr | |
| 0600 | 0700 | | New Zealand, Radio NZ Intl | 15340pa | | | |
| 0600 | 0700 | vi | Nigeria, Radio/Enugu | 6025do | | | |
| 0600 | 0700 | vi | Nigeria, Radio/Ibadan | 6050do | | | |
| 0600 | 0700 | vi | Nigeria, Radio/Kaduna | 4770do | 6090do | 7275do | 9570do |
| 0600 | 0700 | vi | Nigeria, Radio/Lagos | 3326do | 4990do | | |
| 0600 | 0700 | | Nigeria, Voice of | 7255af | 11770af | 15120va | |
| 0600 | 0700 | vi | Papua New Guinea, NBC | | 9675do | 11880sirr | |
| 0600 | 0700 | | Romania, R Romania Intl | 9530na | 11830na | 17720na | |
| 0600 | 0700 | | Russia, University Network | 17765as | | | |
| 0600 | 0700 | | Russia, Voice of Russia | 11770au | 11820au | 12010au | 15275au 15470au |
| | | | 17655au 17665au | 21485au | 21790au | | |
| 0600 | 0700 | | Sierra Leone, SLBS | 3316do | | | |
| 0600 | 0700 | | Singapore, SBC Radio One | 6150do | | | |
| 0600 | 0700 | vi | Solomon Islands, SIBC | 5020do | 9545do | | |
| 0600 | 0700 | | Swaziland, TWR | 6035af | 7205af | 9500af | |
| 0600 | 0700 | | Uganda, Radio | 7110 | 7196do | | |
| 0600 | 0700 | | UK, BBC World Service | 6055af | 6190af | 6195eu | 7160af 9410eu |
| | | | 11760me 11765af | 11940af | 11955as | 12095eu | 15310as 15360as |
| | | | 15575as 17640af | 17760as | 17790as | 21660as | |
| 0600 | 0700 | as | UK, BBC World Service | 17885af | | | |
| 0600 | 0700 | | USA, Armed Forces Radio | | 6458usb | 12689usb | |
| 0600 | 0700 | | USA, KAIJ Dallas TX | 5755va | | | |
| 0600 | 0700 | | USA, KBTN Salt Lk City UT | | 7510na | | |
| 0600 | 0700 | | USA, KWHR Naalehu HI | 117780as | | | |
| 0600 | 0700 | mtwhf | USA, KWHR Naalehu HI | 11565pa | | | |
| 0600 | 0700 | | USA, WBCQ Monticello ME | | 7415na | 9335na | |
| 0600 | 0700 | | USA, WEWN Birmingham AL | | 5825na | 7425na | 15745na |
| 0600 | 0700 | | USA, WHRA Greenbush ME | | 7580af | | |
| 0600 | 0700 | | USA, WHRI Noblesville IN | | 5745va | 7315am | |
| 0600 | 0700 | | USA, WJCR Upton KY | 7490am | 13595as | | |
| 0600 | 0700 | | USA, WMLK Bethel PA | 9465eu | | | |
| 0600 | 0700 | twthfa | USA, WRMI Miami FL | 7385na | | | |
| 0600 | 0700 | | USA, WRNO New Orleans LA | | 7395am | | |
| 0600 | 0700 | | USA, WSHB Cyp Creek SC | | 7535af | | |
| 0600 | 0700 | | USA, WTJC Newport NC | | 9370na | | |
| 0600 | 0700 | | USA, WWCR Nashville TN | | 3215na | 5070na | 5935na 7560na |
| 0600 | 0700 | | USA, WWRB Manchester TN | | 5085va | 6890va | |
| 0600 | 0700 | | USA, WYFR Okeechobee FL | | 7355eu | 11550eu | |
| 0600 | 0700 | vi | Vanuatu, Radio | | 4960do | 7260do | |
| 0600 | 0700 | | Yemen, Rep of Yemen Radio | | 9780me | | |
| 0600 | 0700 | | Zambia, Christian Voice | 9865do | | | |
| 0600 | 0700 | vi | Zimbabwe, Zimbabwe BC Corp | | 5975do | 6045do | |
| 0605 | 0610 | | Croatia, Croatian Radio | 9470pa | | | |
| 0610 | 0615 | mtwhf | Vatican City, Vatican Radio | | 4005eu | 5885eu | 6185eu 7250eu |
| | | | 9645eu 11740eu | 15595va | | | |
| 0630 | 0700 | | Georgia, Georgian Radio | | 11805eu | | |
| 0630 | 0700 | | USA, Voice of America | 5995af | 7170af | 11815eu | 11915me 11930af |
| | | | 12025af 15205as | 15335me | | | |
| 0630 | 0700as | | USA, Voice of America | 5970af | 6035af | 6080af | 7295af 11835af |
| | | | 11995af 13710af | | | | |
| 0630 | 0700 | | Vatican City, Vatican Radio | | 11625af | 13765af | 15570af |
| 0632 | 0700 | | Austria, Radio Austria Intl | | 6155eu | 13730eu | 17870me |
| 0636 | 0653 | | Romania, R Romania Intl | | 7145eu | 9510eu | 9570eu 11790eu |
| | | | 11940eu | | | | |
| 0645 | 0655 | as | Monaco, TWR | | 9870eu | | |
| 0655 | 0700 | mtwhf | Monaco, TWR | | 9870eu | | |

0700 UTC - 3AM E / 2AM C / 12AM P

| | | | | | | | |
|------|------|-----------|---------------------------------|---------|----------|-----------|-----------------|
| 0700 | 0705 | | USA, WWCR Nashville TN | 5070na | 5935na | 7560na | |
| 0700 | 0705 | sm | USA, WWCR Nashville TN | 3210na | | | |
| 0700 | 0705 | twthfa | USA, WWCR Nashville TN | 3215na | | | |
| 0700 | 0725 | | Belgium, RVI Flanders R Intl | 5985eu | | | |
| 0700 | 0730 | vi | Papua New Guinea, NBC | | 9675do | 11880sirr | |
| 0700 | 0730 | | Slovakia, R Slovakia Intl | 15460au | 17550au | 21705au | |
| 0700 | 0730 | | USA, Voice of America | 11915me | 12025af | 15335me | |
| 0700 | 0730 | a | USA, Voice of America | 6873af | | | |
| 0700 | 0745 | | USA, WYFR Okeechobee FL | | 7355eu | 9985af | 11580af |
| 0700 | 0800 | as | Albania, TWR | 12070eu | | | |
| 0700 | 0800 | | Anguilla, Caribbean Beacon | | 6090am | | |
| 0700 | 0800 | vi | Australia, ABC/Alice Springs | | 4835do | | |
| 0700 | 0800 | vi | Australia, ABC/Katherine | | 5025do | | |
| 0700 | 0800 | vi | Australia, ABC/Tennant Creek | | 4910do | | |
| 0700 | 0800 | | Australia, Christian Voice Intl | | 17820as | 21680pa | |
| 0700 | 0800 | | Australia, Radio | | 9660pa | 15240va | 15415as 17580va |
| | | | 17750as 21725as | | | | |
| 0700 | 0800 | vi | Botswana, Radio | | 7255do | 9600do | |
| 0700 | 0800 | vi | Cameroon, RTV | | 4850do | 6005do | |
| 0700 | 0800 | | Canada, CFRX Toronto ON | | 6070do | 6070do | |
| 0700 | 0800 | | Canada, CFVP Calgary AB | | 6030do | 6030do | |
| 0700 | 0800 | | Canada, CHNX Halifax, NS | | 6130do | 6130do | |
| 0700 | 0800 | | Canada, CKZN St John's NF | | 6160do | 6160do | |
| 0700 | 0800 | | Canada, CKZU Vancouver BC | | 6160do | 6160do | |
| 0700 | 0800 | | Costa Rica, R for Peace Intl | | 7455sirr | 15040va | |
| 0700 | 0800 | | Costa Rica, University Network | | 5030am | 6150am | 7375am 9724sa |
| | | | 11870am 13749na | 17645as | | | |
| 0700 | 0800 | | Ecuador, HCJB | | 9780eu | 11755pa | 21455usb |
| 0700 | 0800 | mtwhf | Eqt Guinea, Radio Africa | | 15185af | 15185af | |
| 0700 | 0800 | as/vl | Eqt. Guinea, Radio East Africa | | 15185af | | |
| 0700 | 0800 | a/monthly | Finland, Scandv Weekend Radio | | 5990va | 11720va | |
| 0700 | 0800 | mtwhf | France Radio France Intl | | 15605af | | |
| 0700 | 0800 | | Germany, Deutsche Welle | | 6140eu | | |
| 0700 | 0800 | | Germany, Voice of Hope | | 5975eu | 21590me | |

| | | | | | | | |
|------|------|-------|----------------------------|---------|----------|----------|-------------------------|
| 0700 | 0800 | vi | Ghana, Ghana BC Corp | | 3366do | 4915do | |
| 0700 | 0800 | | Guyana, Voice of | | 3290do | 5950do | |
| 0700 | 0800 | as/vl | Italy, IRRS | 7120va | 7125af | | |
| 0700 | 0800 | | Kenya, Kenya BC Corp | | 4885sirr | 4915sirr | |
| 0700 | 0800 | | Kuwait, Radio | | 15110as | | |
| 0700 | 0800 | vi | Lesotho, Radio | | 4800do | | |
| 0700 | 0800 | | Liberia, ELWA | | 4760do | | |
| 0700 | 0800 | | Liberia, R Liberia Intl | | 6100do | | |
| 0700 | 0800 | | Malaysia, Radio | | 7295do | | |
| 0700 | 0800 | | Malaysia, RTM Sarawak | | 7160do | | |
| 0700 | 0800 | | Malaysia, Voice of | | 6175as | 9750as | 15295pa |
| 0700 | 0800 | mtwhf | Monaco, TWR | | 9870eu | | |
| 0700 | 0800 | | Myanmar, Radio | | 9730do | | |
| 0700 | 0800 | | Namibia, NBC | | 3270af | 3290af | 7215sirr |
| 0700 | 0800 | | New Zealand, Radio NZ Intl | | 15340pa | | |
| 0700 | 0800 | vi | Nigeria, Radio/Enugu | | 6025do | | |
| 0700 | 0800 | vi | Nigeria, Radio/Ibadan | | 6050do | | |
| 0700 | 0800 | vi | Nigeria, Radio/Kaduna | | 4770do | 6090do | 7275do 9570do |
| 0700 | 0800 | vi | Nigeria, Radio/Lagos | | 3326do | 4990do | |
| 0700 | 0800 | | Nigeria, Voice of | | 7255af | 11770af | 15120va |
| 0700 | 0800 | | Romania, R Romania Intl | | 15335af | 17730af | |
| 0700 | 0800 | | Russia, University Network | | 17765as | | |
| 0700 | 0800 | | Russia, Voice of Russia | | 11770au | 11820au | 12010au 15275au 15470au |
| | | | 17495au 17525au | 17590au | 17655au | 17665au | 21485au |
| 0700 | 0800 | | Sierra Leone, SLBS | | 3316do | | |
| 0700 | 0800 | | Singapore, SBC Radio One | | 6150do | | |
| 0700 | 0800 | vi | Solomon Islands, SIBC | | 5020do | 9545do | |
| 0700 | 0800 | | Swaziland, TWR | | 6035af | 7205af | 9500af |
| 0700 | 0800 | | Taiwan, R Taipei Intl | | 5950na | | |
| 0700 | 0800 | | Uganda, Radio | | 5026do | 7110do | 7196do |
| 0700 | 0800 | | UK, BBC World Service | | 6190af | 9410eu | 11760me 11765af 11940af |
| | | | 11955as 12095eu | 15310as | 15360as | 15400af | 15485eu 15565eu |
| | | | 15575as 17640eu | 17760as | 17790as | 17830af | 21660as |
| 0700 | 0800 | as | UK, BBC World Service | | 15575as | 17885af | |
| 0700 | 0800 | | USA, Armed Forces Radio | | 6458usb | 12689usb | |
| 0700 | 0800 | | USA, KAIJ Dallas TX | | 5755va | | |
| 0700 | 0800 | | USA, KBTN Salt Lk City UT | | 7510na | | |
| 0700 | 0800 | | USA, KWHR Naalehu HI | | 11565pa | 17780as | |
| 0700 | 0800 | | USA, WBCQ Monticello ME | | 7415na | | |
| 0700 | 0800 | | USA, WEWN Birmingham AL | | 5825na | 7425na | 15745na |
| 0700 | 0800 | | USA, WHRA Greenbush ME | | 7580af | | |
| 0700 | 0800 | | USA, WHRI Noblesville IN | | 5745va | 7315am | |
| 0700 | 0800 | | USA, WJCR Upton KY | | 7490am | 13595as | |
| 0700 | 0800 | | USA, WMLK Bethel PA | | 9465eu | | |
| 0700 | 0800 | | USA, WRNO New Orleans LA | | 7395am | | |
| 0700 | 0800 | | USA, WSHB Cyp Creek SC | | 7535af | | |
| 0700 | 0800 | | USA, WTJC Newport NC | | 9370na | | |
| 0700 | 0800 | vi | Vanuatu, Radio | | 3945do | 4960do | 7260do |
| 0700 | 0800 | | Zambia, Christian Voice | | 9865do | | |
| 0700 | 0800 | vi | Zimbabwe, Zimbabwe BC Corp | | 5975do | 6045do | |
| 0705 | 0800 | mtwhf | USA, WWCR Nashville TN | | 3210na | 5070na | 5935na 7560na |
| 0720 | 0735 | | Swaziland, TWR | | 6035af | 7205af | 9500af |
| 0730 | 0758 | | Finland, YLE/Radio Finland | | 9510va | 21670va | |
| 0730 | 0800 | vi | Austria, AWR Europe | | 17820eu | | |
| 0730 | 0800 | t h | Georgia, Georgian Radio | | 6080me | | |
| 0730 | 0800 | | Guam, KTWR/ TWR | | 15200as | | |
| 0730 | 0800 | vi | Papua New Guinea, NBC | | 4890do | 9675sirr | |
| 0730 | 0800 | | Switzerland, Swiss R Intl | | 9885af | 13635af | 17665af |
| 0740 | 0745 | as | Croatia, Croatian Radio | | 9470pa | | |
| 0745 | 0755 | | Armenia, TWR | | 12070eu | | |
| 0755 | 0800 | | Albania, TWR | | 12070eu | | |
| 0755 | 0800 | | Armenia, TWR | | 12070eu | | |

0800 UTC - 4AM E / 3AM C / 1AM P

| | | | | | | | | |
|------|------|-----------|---------------------------------|----------|---------|----------|---------|---------|
| 0800 | 0804 | | Pakistan, Radio | 17510eu | 21465eu | | | |
| 0800 | 0820 | mtwhf | Monaco, TWR | 9870eu | | | | |
| 0800 | 0825 | | Malaysia, Voice of | 6175as | 9750as | 15295pa | | |
| 0800 | 0827 | | Czech Rep, Radio Prague Intl | | 11600eu | 15255eu | | |
| 0800 | 0830 | vi | Australia, ABC/Alice Springs | | 4835do | | | |
| 0800 | 0830 | vi | Australia, ABC/Katherine | | 5025do | | | |
| 0800 | 0830 | vi | Australia, ABC/Tennant Creek | | 4910do | | | |
| 0800 | 0830 | | Myanmar, Radio | 9730do | | | | |
| 0800 | 0830 | | Sierra Leone, SLBS | 3316do | | | | |
| 0800 | 0830 | | USA, Voice of America | 11995as | 13615as | 15150as | | |
| 0800 | 0900 | mtwhf | Albania, TWR | 12070eu | | | | |
| 0800 | 0900 | | Anguilla, Caribbean Beacon | | 6090am | | | |
| 0800 | 0900 | | Armenia, TWR | 12070eu | | | | |
| 0800 | 0900 | | Australia, Christian Voice Intl | | 17820as | 21680pa | | |
| 0800 | 0900 | | Australia, Radio | 9580va | 9710as | 12080pa | 15240va | 15415as |
| | | | 17580as 21725as | | | | | |
| 0800 | 0900 | vi | Austria, AWR Europe | 9660eu | | | | |
| 0800 | 0900 | mtwhf | Bhutan, Bhutan BC Service | | 5030al | 6035do | | |
| 0800 | 0900 | vi | Botswana, Radio | 7255do | 9600do | | | |
| 0800 | 0900 | vi | Cameroon, RTV | 4850do | 6005do | | | |
| 0800 | 0900 | | Canada, CFRX Toronto ON | | 6070do | | | |
| 0800 | 0900 | | Canada, CFVP Calgary AB | | 6030do | | | |
| 0800 | 0900 | | Canada, CHNX Halifax, NS | | 6130do | | | |
| 0800 | 0900 | | Canada, CKZN St John's NF | | 6160do | | | |
| 0800 | 0900 | | Canada, CKUJ Vancouver BC | | 6160do | | | |
| 0800 | 0900 | | Costa Rica, R for Peace Intl | 7455sirr | | 15040va | | |
| 0800 | 0900 | | Costa Rica, University Network | 7003am | 6150am | 7375am | 9724sa | |
| | | | 11870am 13749na 17645as | | | | | |
| 0800 | 0900 | | Ecuador, HCJB | 9780eu | 11755pa | 21455usb | | |
| 0800 | 0900 | mtwhf | Eq't Guinea, Radio Africa | | 15185af | | | |
| 0800 | 0900 | as/vl | Eq't. Guinea, Radio East Africa | | 15185af | | | |
| 0800 | 0900 | a/monthly | Finland, Scandv Weekend Radio | | 6170va | 11720va | | |
| 0800 | 0900 | | Germany, Deutsche Welle | | 6140eu | | | |
| 0800 | 0900 | a | Germany, Remnants Hope Minstr | 13810as | | | | |
| 0800 | 0900 | | Germany, Voice of Hope | 5975eu | 21590me | | | |
| 0800 | 0900 | vi | Ghana, Ghana BC Cora | 3366do | 4915do | | | |

Shortwave Guide



| | | | | | | | |
|------|------|------------------------------|---------|----------|---------|---------|---------|
| 0800 | 0900 | Guam, KTWR/ TWR | 15200as | | | | |
| 0800 | 0900 | Guyana, Voice of | 3290do | 5950do | 15150as | | |
| 0800 | 0900 | Indonesia, Voice of | 9525pa | | | | |
| 0800 | 0900 | Italy, IRRS | 7120va | 7125af | | | |
| 0800 | 0900 | Kenya, Kenya BC Corp | 4885irr | 4915irr | | | |
| 0800 | 0900 | Lesotho, Radio | 4800do | | | | |
| 0800 | 0900 | Liberia, ELWA | 4760do | | | | |
| 0800 | 0900 | Liberia, R Liberia Intl | 6100do | | | | |
| 0800 | 0900 | Malaysia, Radio | 7295do | | | | |
| 0800 | 0900 | Malta, VO Mediterranean | 9840eu | | | | |
| 0800 | 0900 | Namibia, NBC | 7215af | | | | |
| 0800 | 0900 | New Zealand, Radio NZ Intl | 11675pa | | | | |
| 0800 | 0900 | Nigeria, Radio/Enugu | 6025do | | | | |
| 0800 | 0900 | Nigeria, Radio/Ibadan | 6050do | | | | |
| 0800 | 0900 | Nigeria, Radio/Kaduna | 4770do | 6090do | 7275do | 9570do | |
| 0800 | 0900 | Nigeria, Radio/Lagos | 3326do | 4990do | | | |
| 0800 | 0900 | Nigeria, Voice of | 7255af | 11770af | 15120va | | |
| 0800 | 0900 | Papua New Guinea, NBC | 4890do | 9675irr | | | |
| 0800 | 0900 | Russia, University Network | 17765as | | | | |
| 0800 | 0900 | Russia, Voice of Russia | 11770au | 11820au | 15275au | 15470au | 17495au |
| 0800 | 0900 | Singapore, SBC Radio One | 17525af | 17590au | 17665au | | |
| 0800 | 0900 | Solomon Islands, SIBC | 5020do | 6150do | | | |
| 0800 | 0900 | South Korea, R Korea Intl | 9570om | 13670eu | | | |
| 0800 | 0900 | UK, BBC World Service | 6190af | 9410eu | 11940af | 11955as | 12095eu |
| | | 15310as | 15360as | 15400af | 15485eu | 15565eu | 17640eu |
| | | 17830af | 17885af | 21470af | 21660as | 21830as | |
| 0800 | 0900 | USA, BBC World Service | 15575as | | | | |
| 0800 | 0900 | USA, Armed Forces Radio | 6458usb | 12689usb | | | |
| 0800 | 0900 | USA, KAJI Dallas TX | 5755va | | | | |
| 0800 | 0900 | USA, KNLS Anchor Point AK | 9615as | | | | |
| 0800 | 0900 | USA, KTNB Salt Lk City UT | 7510na | | | | |
| 0800 | 0900 | USA, KWHR Naalehu HI9930as | 11565pa | | | | |
| 0800 | 0900 | USA, WBCQ Monticello ME | 7415na | | | | |
| 0800 | 0900 | USA, WEWN Birmingham AL | 5825na | 7425na | 15745na | | |
| 0800 | 0900 | USA, WHRI Noblesville IN | 5745va | 7315am | | | |
| 0800 | 0900 | USA, WJCR Upton KY | 7490am | | | | |
| 0800 | 0900 | USA, WMLK Bethel PA | 9465eu | | | | |
| 0800 | 0900 | USA, WRMI Miami FL | 7385na | | | | |
| 0800 | 0900 | USA, WRNO New Orleans LA | 7395am | | | | |
| 0800 | 0900 | USA, WSHB Cyp Creek SC | 7535eu | 9845au | | | |
| 0800 | 0900 | USA, WTJC Newport NC | 9370na | | | | |
| 0800 | 0900 | USA, WWCN Nashville TN | 3210na | 5070na | 5935na | 7560na | |
| 0800 | 0900 | Vanuatu, Radio | 3945do | 4960do | | | |
| 0800 | 0900 | Zambia, Christian Voice | 9865do | | | | |
| 0800 | 0900 | Zimbabwe, Zimbabwe BC Corp | 5975do | 6045do | | | |
| 0805 | 0810 | Croatia, Croatian Radio | 13820au | | | | |
| 0815 | 0900 | Guam, KTWR/ TWR | 15200as | 15330as | | | |
| 0830 | 0845 | Seychelles, FEBA Radio | 15460as | | | | |
| 0830 | 0900 | Australia, ABC/Alice Springs | 2310do | | | | |
| 0830 | 0900 | Australia, ABC/Katherine | 2485do | | | | |
| 0830 | 0900 | Australia, ABC/Tennant Creek | 2325do | | | | |
| 0830 | 0900 | Austria, AWR Europe | 9660eu | 17820af | | | |
| 0830 | 0900 | Austria, Radio Austria Intl | 17820eu | | | | |
| 0830 | 0900 | Georgia, Georgian Radio | 11910eu | | | | |
| 0830 | 0900 | Lithuania, R Vilnius | 9710eu | | | | |
| 0830 | 0900 | Switzerland, Swiss R Intl | 21770af | | | | |
| 0830 | 0900 | USA, Voice of America | 11995as | 13615as | 15150as | 15165me | 15235me |
| | | 17875af | | | | | |
| 0840 | 0900 | Armenia, Voice of | 4810eu | 15270eu | | | |

0900 UTC - 5AM E / 4AM C / 2AM P

| | | | | | | | |
|------|--------|-----------|---------------------------------|----------|---------|---------|---------|
| 0900 | 0915 | vi | Ghana, Ghana BC Corp | 3366do | 4915do | | |
| 0900 | 0920 | mtwhf | Albania, TWR | 12070eu | | | |
| 0900 | 0920 | | Armenia, TWR | 12070eu | | | |
| 0900 | 0930 | | Australia, Radio | 9580va | 15420va | 21820va | |
| 0900 | 0930 | | Austria, AWR Europe | 11670af | | | |
| 0900 | 0930 | | Austria, Radio Austria Intl | 11670eu | | | |
| 0900 | 0930as | | Guam, KTWR/ TWR | 15330as | | | |
| 0900 | 0945 | | Germany, Deutsche Welle | 6160pa | 7300as | 9510af | 11785af |
| | | | 15410af | 17800pa | 17845af | 21560af | |
| 0900 | 0956 | | China, China Radio Intl | 11730pa | 15210pa | | |
| 0900 | 1000 | | Anguilla, Caribbean Beacon | 6090am | | | |
| 0900 | 1000 | vi | Australia, ABC/Alice Springs | 2310do | | | |
| 0900 | 1000 | vi | Australia, ABC/Katherine | 2485do | | | |
| 0900 | 1000 | vi | Australia, ABC/Tennant Creek | 2325do | | | |
| 0900 | 1000 | | Australia, Christian Voice Intl | 13775pa | 17725pa | | |
| 0900 | 1000 | vi | Botswana, Radio | 7255do | | | |
| 0900 | 1000 | vi | Cameroon, RTV | 4850do | | | |
| 0900 | 1000 | | Canada, CFRX Toronto ON | 6070do | | | |
| 0900 | 1000 | | Canada, CFVP Calgary AB | 6030do | | | |
| 0900 | 1000 | | Canada, CHNX Halifax, NS | 6130do | | | |
| 0900 | 1000 | | Canada, CKZN St John's NF | 6160do | | | |
| 0900 | 1000 | | Canada, CKZU Vancouver BC | 6160do | | | |
| 0900 | 1000 | | Costa Rica, R for Peace Intl | 7455irr | 15040va | | |
| 0900 | 1000 | | Costa Rica, University Network | 5030am | 6150am | 7375am | 9724sa |
| | | | 11870am | 13749na | 17645as | | |
| 0900 | 1000 | | Ecuador, HCJB | 11755pa | | | |
| 0900 | 1000 | mtwhf | Eqt Guinea, Radio Africa | 21455usb | | | |
| 0900 | 1000 | as/vl | Eqt. Guinea, Radio East Africa | 15185af | | | |
| 0900 | 1000 | a/monthly | Finland, Scandv Weekend Radio | 6170va | 11720va | | |
| 0900 | 1000 | | Germany, Deutsche Welle | 6140eu | | | |
| 0900 | 1000 | | Germany, Voice of Hope | 21590me | | | |
| 0900 | 1000 | | Guyana, Voice of | 3290do | 5950do | | |
| 0900 | 1000 | as/vl | Italy, IRRS | 7120va | 7125af | | |
| 0900 | 1000 | | Kenya, Kenya BC Corp | 4885irr | 4915irr | | |
| 0900 | 1000 | vi | Lesotho, Radio | 4800do | | | |
| 0900 | 1000 | | Liberia, ELWA | 4760do | | | |
| 0900 | 1000 | | Liberia, R Liberia Intl | 6100do | | | |
| 0900 | 1000 | | Malaysia, Radio | 7295do | | | |
| 0900 | 1000 | | Namibia, NBC | 7165af | 7215af | | |
| 0900 | 1000 | | Netherlands, Radio | 7260va | 9790va | 12065va | |
| 0900 | 1000 | vi | Nigeria, Radio/Enugu | 6025do | | | |
| 0900 | 1000 | vi | Nigeria, Radio/Ibadan | 6050do | | | |
| 0900 | 1000 | vi | Nigeria, Radio/Kaduna | 4770do | 6090do | 7275do | 9570do |
| 0900 | 1000 | vi | Nigeria, Radio/Lagos | 4990do | | | |
| 0900 | 1000 | vi | Papua New Guinea, NBC | 4890do | | | |
| 0900 | 1000 | | Russia, University Network | 17765as | | | |
| 0900 | 1000 | | Singapore, SBC Radio One | 6150do | | | |

| | | | | | | | |
|------|------|-----------------------------|-------------------------|----------|---------|---------|---------|
| 0900 | 1000 | Liberia, R Liberia Intl | 6100do | | | | |
| 0900 | 1000 | Malaysia, Radio | 7295do | | | | |
| 0900 | 1000 | Namibia, NBC | 7165af | 7215af | | | |
| 0900 | 1000 | New Zealand, Radio NZ Intl | 11675pa | | | | |
| 0900 | 1000 | Nigeria, Radio/Enugu | 6025do | | | | |
| 0900 | 1000 | Nigeria, Radio/Ibadan | 6050do | | | | |
| 0900 | 1000 | Nigeria, Radio/Kaduna | 4770do | 6090do | 7275do | 9570do | |
| 0900 | 1000 | Nigeria, Radio/Lagos | 3326do | 4990do | | | |
| 0900 | 1000 | Nigeria, Voice of | 7255af | 11770af | 15120va | | |
| 0900 | 1000 | Palau, KHBN/ VO Hope | 15725as | | | | |
| 0900 | 1000 | Papua New Guinea, NBC | 4890do | 9675irr | | | |
| 0900 | 1000 | Russia, University Network | 17765as | | | | |
| 0900 | 1000 | Singapore, SBC Radio One | 6150do | | | | |
| 0900 | 1000 | Solomon Islands, SIBC | 5020do | | | | |
| 0900 | 1000 | UK, BBC World Service | 6190af | 6195as | 9605as | 9740as | 11760me |
| | | 11940af | 11945as | 12095eu | 15190sa | 15310as | 15360as |
| | | 15485eu | 15565eu | 15575as | 17640eu | 17760as | 17790as |
| | | 17885af | 21470af | 21660as | | | |
| 0900 | 1000 | USA, Armed Forces Radio | 6458usb | 12689usb | | | |
| 0900 | 1000 | USA, KAJI Dallas TX | 5755va | | | | |
| 0900 | 1000 | USA, KTNB Salt Lk City UT | 7510na | | | | |
| 0900 | 1000 | USA, KWHR Naalehu HI9930as | 11565pa | | | | |
| 0900 | 1000 | USA, Voice of America | 11995as | 13615as | 15150as | 15165me | 15235me |
| | | 17875af | | | | | |
| 0900 | 1000 | USA, WBCQ Monticello ME | 7415na | | | | |
| 0900 | 1000 | USA, WEWN Birmingham AL | 5825na | 7425na | 15745na | | |
| 0900 | 1000 | USA, WHRA Greenbush ME | 7580af | | | | |
| 0900 | 1000 | USA, WHRI Noblesville IN | 5745va | 7315am | | | |
| 0900 | 1000 | USA, WJCR Upton KY | 7490am | | | | |
| 0900 | 1000 | USA, WRMI Miami FL | 7385na | | | | |
| 0900 | 1000 | USA, WSHB Cyp Creek SC | 7535eu | 9455sa | | | |
| 0900 | 1000 | USA, WTJC Newport NC | 9370na | | | | |
| 0900 | 1000 | USA, WWCN Nashville TN | 3210na | 5070na | 5935na | 7560na | |
| 0900 | 1000 | Vanuatu, Radio | 3945do | 4960do | | | |
| 0900 | 1000 | Vatican City, Vatican Radio | 5885eu | | | | |
| 0900 | 1000 | Zambia, Christian Voice | 9865do | | | | |
| 0900 | 1000 | Zimbabwe, Zimbabwe BC Corp | 5975do | 6045do | | | |
| 0915 | 1000 | vi | Ghana, Ghana BC Corp | 6130do | 4915do | | |
| 0915 | 1000 | vi/as | Ghana, Ghana BC Corp | 4915do | | | |
| 0930 | 0950 | | Greece, Voice of | 9420eu | | | |
| 0930 | 1000 | | Australia, Radio | 9580va | 15420va | 17750va | 21820va |
| 0930 | 1000 | | Georgia, Georgian Radio | 11910me | | | |
| 0930 | 1000 | | Netherlands, Radio | 7260va | 9790va | 12065va | |
| 0940 | 0945 | | Croatia, Croatian Radio | 13820au | | | |

1000 UTC - 6AM E / 5AM C / 3AM P

| | | | | | | | |
|------|------|-----------|---------------------------------|---------------|----------|---------|-----------------|
| 1000 | 1005 | | New Zealand, Radio NZ Intl | 11675pa | | | |
| 1000 | 1027 | | Czech Rep, Radio Prague Intl | 21745va | | | |
| 1000 | 1027 | | Vietnam, Voice of | 9840au | 12020au | | |
| 1000 | 1030 | | Guam, KSDA/ AWR | 11705as | 11900as | | |
| 1000 | 1030 | | Palau, KHBN/ VO Hope | 15725as | | | |
| 1000 | 1030 | | UK, RTE Radio | 11685au | 15280au | | |
| 1000 | 1045 | | USA, KWHR Naalehu HI | 9930as | 11565pa | | |
| 1000 | 1056 | | China, China Radio Intl | 11730pa | 15210pa | | |
| 1000 | 1056 | | North Korea, Voice of | 9335am | 9850as | 11710am | 11735as |
| 1000 | 1100 | | Anguilla, Caribbeean Beacon | 6090am | | | |
| 1000 | 1100 | vi | Australia, ABC/Alice Springs | 2310do | | | |
| 1000 | 1100 | vi | Australia, ABC/Katherine | 2485do | | | |
| 1000 | 1100 | vi | Australia, ABC/Tennant Creek | 2325do | | | |
| 1000 | 1100 | | Australia, Christian Voice Intl | 12775pa | 17655pa | 17725pa | |
| 1000 | 1100 | | Australia, Radio | 9580va | 15420va | 17750va | 21820va |
| 1000 | 1100 | as | Bhutan, Bhutan BC Service | 5030al | 6035do | | |
| 1000 | 1100 | vi | Botswana, Radio | 7255do | 9600do | | |
| 1000 | 1100 | | Canada, CFRX Toronto ON | 6070do | | | |
| 1000 | 1100 | | Canada, CFVP Calgary AB | 6030do | | | |
| 1000 | 1100 | | Canada, CHNX Halifax, NS | 6130do | | | |
| 1000 | 1100 | | Canada, CKZN St John's NF | 6160do | | | |
| 1000 | 1100 | | Canada, CKZU Vancouver BC | 6160do | | | |
| 1000 | 1100 | | Costa Rica, R for Peace Intl | 7455irr | 15040va | | |
| 1000 | 1100 | | Costa Rica, University Network | 5030am | 6150am | 7375am | 9724sa |
| | | | 11870am 13749na | 17645as | | | |
| 1000 | 1100 | | Ecuador, HCJB | 11755pa | 21455usb | | |
| 1000 | 1100 | mtwhf | Eqt Guinea, Radio Africa | 15185af | | | |
| 1000 | 1100 | as/vi | Eqt. Guinea, Radio East Africa | 15185af | | | |
| 1000 | 1100 | a/monthly | Finland, Scandv Weekend Radio | 6170va | 11720va | | |
| 1000 | 1100 | | Germany, Deutsche Welle | 6140eu | | | |
| 1000 | 1100 | | Germany, Voice of Hope | 21590me | | | |
| 1000 | 1100 | vi | Ghana, Ghana BC Corp | 6130do | | | |
| 1000 | 1100 | vi/as | Ghana, Ghana BC Corp | 4915do | | | |
| 1000 | 1100 | | Guyana, Voice of | 5950do | | | |
| 1000 | 1100 | | India, All India Radio | 11585as | 13700au | 15020as | 15260as 17510as |
| | | | 17800au 17895au | | | | |
| 1000 | 1100 | as/vi | Italy, IRRS | 7120va 7125al | | | |
| 1000 | 1100 | | Japan, Radio9695as | 15590as | 21755pa | | |
| 1000 | 1100 | | Kenya, Kenya BC Corp | 4885irr | 4915irr | | |
| 1000 | 1100 | vi | Lesotho, Radio | 4800do | | | |
| 1000 | 1100 | | Liberia, ELWA | 4760do | | | |
| 1000 | 1100 | | Liberia, R Liberia Intl | 6100do | | | |
| 1000 | 1100 | | Malaysia, Radio | 7295do | | | |
| 1000 | 1100 | | Namibia, NBC | 7165af | 7215af | | |
| 1000 | 1100 | | Netherlands, Radio | 7260va | 9790va | 12065va | |
| 1000 | 1100 | vi | Nigeria, Radio/Enugu | 6025do | | | |
| 1000 | 1100 | vi | Nigeria, Radio/Ibadan | 6050do | | | |
| 1000 | 1100 | vi | Nigeria, Radio/Kaduna | 4770do | 6090do | 7275do | 9570do |
| 1000 | 1100 | vi | Nigeria, Radio/Lagos | 4990do | 7285do | | |
| 1000 | 1100 | vi | Papua New Guinea, NBC | | 4890do | 9675irr | |
| 1000 | 1100 | | Russia, University Network | | 17765as | | |
| 1000 | 1100 | | Singapore, SBC Radio One | | 6150do | | |

Shortwave Guide



| | | | | | | | | | |
|------|------|-------|------------------------------|---------|---------|----------|---------|---------|--|
| 1000 | 1100 | vi | Solomon Islands, SIBC | 5020do | | | | | |
| 1000 | 1100 | | UK, BBC World Service | 6190af | 6195va | 9605as | 9740as | 11760me | |
| | | | 11940af 11945as 12095eu | 15310as | 15360as | 15485eu | 15565eu | | |
| | | | 15575as 17640eu 17760as | 17790as | 21470af | 21660as | | | |
| 1000 | 1100 | as | UK, BBC World Service | 15190sa | 15400af | 17830af | | | |
| 1000 | 1100 | | USA, Armed Forces Radio | | 6458usb | 12689usb | | | |
| 1000 | 1100 | | USA, KAIJ Dallas TX | 5755va | | | | | |
| 1000 | 1100 | | USA, KTBN Salt Lk City UT | | 7510na | | | | |
| 1000 | 1100 | | USA, Voice of America | 5745am | 5985pa | 7370am | 9590am | 11720as | |
| | | | 15165me 15235me 15250as | 15455as | 17895me | | | | |
| 1000 | 1100 | | USA, WBCQ Monticello ME | | 7415na | | | | |
| 1000 | 1100 | | USA, WEWN Birmingham AL | | 5825na | 7425na | 15395na | 15745eu | |
| 1000 | 1100 | | USA, WHRI Noblesville IN | | 6040na | 9495am | | | |
| 1000 | 1100 | | USA, WJCR Upton KY | 7490am | 13595as | | | | |
| 1000 | 1100 | | USA, WRMI Miami FL | 9955am | | | | | |
| 1000 | 1100 | | USA, WRNO New Orleans LA | | 7395am | | | | |
| 1000 | 1100 | | USA, WSHB Cyp Creek SC | | 6095am | 9455sa | 11780as | | |
| 1000 | 1100 | | USA, WTJC Newport NC | | 9370na | | | | |
| 1000 | 1100 | | USA, WWCN Nashville TN | | 3210na | 5070na | 5935na | 7560na | |
| 1000 | 1100 | | USA, WYFR Okeechobee FL | | 5950na | | | | |
| 1000 | 1100 | vi | Vanuatu, Radio | 3945do | 4960do | 7260do | | | |
| 1000 | 1100 | | Zambia, Christian Voice | 9865do | | | | | |
| 1000 | 1100 | vi | Zimbabwe, Zimbabwe BC Corp | | 5975do | 6045do | | | |
| 1005 | 1100 | | New Zealand, Radio NZ Intl | | 15175pa | | | | |
| 1030 | 1035 | | Israel, Kol Israel | 15640va | 17545va | | | | |
| 1030 | 1045 | mtwhf | Ethiopia, Radio | 5990do | 7110do | 9704do | | | |
| 1030 | 1055 | | Belgium, RVI Flanders R Intl | | 9865as | | | | |
| 1030 | 1100 | | Guam, KSDA/ AWR | 11900as | | | | | |
| 1030 | 1100 | | Malaysia, RTM Sarawak | 7160do | | | | | |
| 1030 | 1100 | | Mongolia, Voice of | 12085as | | | | | |
| 1030 | 1100 | | Palau, KHBNI/ VO Hope | 9965as | 15725as | | | | |
| 1030 | 1100 | | UAE, Emirates Radio | 13675eu | 15370eu | 15400eu | 21597eu | | |
| 1045 | 1100 | | USA, KWHR Naalehu HI | 9930as | | | | | |
| 1045 | 1100 | as | USA, KWHR Naalehu HI | 11565pa | | | | | |

1100 UTC - 7AM E / 6AM C / 4AM P

| | | | | | | | | | |
|------|------|-----------|---------------------------------|---------|----------|----------|---------|---------|--|
| 1100 | 1104 | | Pakistan, Radio | 17520eu | 21465eu | | | | |
| 1100 | 1120 | fa | Kazakhstan, R Almaty | 9620eu | 11840eu | | | | |
| 1100 | 1127 | | Vietnam, Voice of | 7285as | | | | | |
| 1100 | 1130 | as | Bhutan, Bhutan BC Service | | 5030al | 6035do | | | |
| 1100 | 1130 | | Netherlands, Radio | 7260va | 9790va | 12065va | | | |
| 1100 | 1130 | mtwhf | UK, BBC Caribbean Report | | 6195am | 15190am | | | |
| 1100 | 1130 | as | UK, BBC World Service | 6195am | 15190am | | | | |
| 1100 | 1145 | | Germany, Deutsche Welle | | 15410af | 17800af | 21780af | | |
| 1100 | 1200 | | Anguilla, Caribbean Beacon | | 11775am | | | | |
| 1100 | 1200 | vi | Australia, ABC/Alice Springs | | 2310do | | | | |
| 1100 | 1200 | vi | Australia, ABC/Katherine | | 2485do | | | | |
| 1100 | 1200 | vi | Australia, ABC/Tennant Creek | | 2325do | | | | |
| 1100 | 1200 | | Australia, Christian Voice Intl | | 13775pa | 15530as | 17655pa | 17725pa | |
| 1100 | 1200 | | Australia, Radio | 6020va | 9475va | 9580va | 11650pa | 11880as | |
| | | | 12080pa 15420va 21820va | | | | | | |
| 1100 | 1200 | vi | Austria, Radio Africa Intl | 17815eu | | | | | |
| 1100 | 1200 | vi | Botswana, Radio | 7255do | 9600do | | | | |
| 1100 | 1200 | | Bulgaria, Radio | 15700eu | 17500eu | | | | |
| 1100 | 1200 | | Canada, CBC Northern Service | | 9625do | | | | |
| 1100 | 1200 | | Canada, CFRX Toronto ON | | 6070do | | | | |
| 1100 | 1200 | | Canada, CFVP Calgary AB | | 6030do | | | | |
| 1100 | 1200 | | Canada, CHNX Halifax, NS | | 6130do | | | | |
| 1100 | 1200 | | Canada, CKZN St John's NF | | 6160do | | | | |
| 1100 | 1200 | | Canada, CKZU Vancouver BC | | 6160do | | | | |
| 1100 | 1200 | | Costa Rica, R for Peace Intl | | 7455sirr | 15040va | | | |
| 1100 | 1200 | | Costa Rica, University Network | | 5030am | 6150am | 7375am | 9724sa | |
| | | | 11870am 13749na 17645as | | | | | | |
| 1100 | 1200 | | Ecuador, HCJB | 12005am | 15115am | 21455usb | | | |
| 1100 | 1200 | mtwhf | Eqt Guinea, Radio Africa | | 15185af | | | | |
| 1100 | 1200 | as/vl | Eqt. Guinea, Radio East Africa | | 15185af | | | | |
| 1100 | 1200 | a/monthly | Finland, Scandv Weekend Radio | | 6170va | 11720va | | | |
| 1100 | 1200 | a | Finland, YLE/Radio Finland | | 17820va | | | | |
| 1100 | 1200 | | Germany, Deutsche Welle | | 6140eu | | | | |
| 1100 | 1200 | | Germany, Voice of Hope | | 21590me | | | | |
| 1100 | 1200 | vi | Ghana, Ghana BC Corp | | 6130do | | | | |
| 1100 | 1200 | vi/as | Ghana, Ghana BC Corp | | 4915do | | | | |
| 1100 | 1200 | | Guyana, Voice of | 5950do | | | | | |
| 1100 | 1200 | | Iran, VO Islamic Rep. of Iran | | 15185as | 15375as | 15385as | 15480as | |
| | | | 21470as 21730as | | | | | | |
| 1100 | 1200 | as/vl | Italy, IRRS | 7120va | 7125al | | | | |
| 1100 | 1200 | | Japan, Radio6120na | | 9695as | 15590as | 21755as | | |
| 1100 | 1200 | | Jordan, Radio | | 11690eu | | | | |
| 1100 | 1200 | | Kenya, Kenya BC Corp | | 4885sirr | 4915sirr | | | |
| 1100 | 1200 | vi | Lesotho, Radio | | 4800do | | | | |
| 1100 | 1200 | | Liberia, ELWA | | 4760do | | | | |
| 1100 | 1200 | | Liberia, R Liberia Intl | | 6100do | | | | |
| 1100 | 1200 | | Malaysia, Radio | | 7295do | | | | |
| 1100 | 1200 | | Malaysia, TRM Sarawak | | 7160do | | | | |
| 1100 | 1200 | | Namibia, NBC | | 7165af | 7215af | | | |
| 1100 | 1200 | | New Zealand, Radio NZ Intl | | 15175pa | | | | |
| 1100 | 1200 | vi | Nigeria, Radio/Enugu | | 6025do | | | | |
| 1100 | 1200 | vi | Nigeria, Radio/Ibadan | | 6050do | | | | |
| 1100 | 1200 | vi | Nigeria, Radio/Kaduna | | 4770do | 6090do | 7275do | 9570do | |
| 1100 | 1200 | vi | Nigeria, Radio/Lagos | | 4990do | 7285do | | | |
| 1100 | 1200 | | Palau, KHBNI/ VO Hope | 9965as | | | | | |
| 1100 | 1200 | vi | Papua New Guinea, NBC | | 4890do | 9675sirr | | | |
| 1100 | 1200 | | Russia, University Network | | 17765as | | | | |
| 1100 | 1200 | | Singapore, R Singapore Intl | | 6150as | 9600as | | | |
| 1100 | 1200 | | Taiwan, R Taipei Intl | | 7445as | 11985as | | | |
| 1100 | 1200 | | Taiwan, Voice of Asia | | 7445as | | | | |
| 1100 | 1200 | | UK, BBC World Service | 6190af | 6195as | 9740as | 11760me | 11940af | |
| | | | 12095eu 15310as 15360as | 15400af | 15485eu | 15565eu | 15575me | 17640af | |

| | | | | | | | | | |
|------|------|------|------------------------------|----------|-----------|----------|---------|---------|--|
| 1100 | 1200 | | 17640eu 17700as 17790sa | 17830af | 17885af | 21470af | | | |
| 1100 | 1200 | | Ukraine, R Ukraine Intl | 11720eu | 11825na | 15520na | | | |
| 1100 | 1200 | | USA, Armed Forces Radio | | 6458usb | 12689usb | | | |
| 1100 | 1200 | | USA, KAIJ Dallas TX | 5755va | | | | | |
| 1100 | 1200 | | USA, KTBN Salt Lk City UT | | 7510na | | | | |
| 1100 | 1200 | | USA, KWHR Naalehu HI | 9930as | | | | | |
| 1100 | 1200 | as | USA, KWHR Naalehu HI | 11565pa | | | | | |
| 1100 | 1200 | | USA, Voice of America | 5985pa | 6110as | 9645as | 9760as | 11705as | |
| | | | 11720as 15250as 15455as | | | | | | |
| 1100 | 1200 | | USA, WEWN Birmingham AL | | 5825na | 7425na | 15395na | 15745eu | |
| 1100 | 1200 | | USA, WHRI Noblesville IN | | 6040na | 9495am | | | |
| 1100 | 1200 | | USA, WJCR Upton KY | 7490am | 13595as | | | | |
| 1100 | 1200 | | USA, WRMI Miami FL | 9955am | | | | | |
| 1100 | 1200 | | USA, WRNO New Orleans LA | | 7395am | | | | |
| 1100 | 1200 | | USA, WSHB Cyp Creek SC | | 6095am | 11660am | | | |
| 1100 | 1200 | | USA, WTJC Newport NC | | 9370na | | | | |
| 1100 | 1200 | | USA, WWCN Nashville TN | | 5070na | 5935na | 7560na | 15685na | |
| 1100 | 1200 | | USA, WYFR Okeechobee FL | | 5950na | 11830na | | | |
| 1100 | 1200 | vi/s | Vanuatu, Radio | 3945do | 4960do | 7260do | | | |
| 1100 | 1200 | | Zambia, Christian Voice | 9865do | | | | | |
| 1100 | 1200 | vi | Zimbabwe, Zimbabwe BC Corp | | 5975do | 6045do | | | |
| 1115 | 1127 | | Zambia, National BC Corp | | 6265do | | | | |
| 1115 | 1145 | | Nepal, Radio3230as | 5005as | | | | | |
| 1120 | 1140 | w | Kazakhstan, R Almaty | 9620eu | 11840eu | | | | |
| 1130 | 1145 | vi | Libya, Voice of Africa | 1543sirr | 17750sirr | | | | |
| 1130 | 1157 | | Czech Rep. Radio Prague Intl | | 11640eu | 21745va | | | |
| 1130 | 1200 | | Netherlands, Radio | 5965na | 6045eu | 9860eu | | | |
| 1130 | 1200 | | South Korea, R Korea Intl | | 9650na | | | | |
| 1130 | 1200 | a | UK, Wales Radio Intl | 17625au | | | | | |
| 1130 | 1200 | f | Vatican City, Vatican Radio | | 15595va | 17515va | | | |
| 1140 | 1200 | t | Kazakhstan, R Almaty | 9620eu | 11840eu | | | | |

1200 UTC - 8AM E / 7AM C / 5AM P

| | | | | | | | | | |
|------|------|-----------|---------------------------------|---------|---------|----------|---------|---------|--|
| 1200 | 1210 | | New Zealand, Radio NZ Intl | | 15175pa | | | | |
| 1200 | 1220 | mtwhf | UK, BBC Caribbean Report | | 6195am | 15190am | | | |
| 1200 | 1220 | as | UK, BBC World Service | 6195am | 15190am | | | | |
| 1200 | 1227 | | Iran, VO Islamic Rep. of Iran | | 15185as | 15375as | 15385as | 15480as | |
| | | | 21470as 21730as | | | | | | |
| 1200 | 1230 | | France Radio France Intl | 15540af | 25820af | | | | |
| 1200 | 1230 | | Mongolia, Voice of | 12015as | | | | | |
| 1200 | 1230 | | South Korea, R Korea Intl | | 9650na | | | | |
| 1200 | 1230 | | Uzbekistan, Radio Tashkent | | 5060as | 5955as | 5975as | 6025as | |
| | | | 9715as | | | | | | |
| 1200 | 1245 | | USA, WYFR Okeechobee FL | | 5950na | 11830na | 11970na | 13695na | |
| 1200 | 1256 | | China, China Radio Intl | 9705as | 9730as | 9760pa | 11760pa | 11980as | |
| | | | 15415pa | | | | | | |
| 1200 | 1259 | | Canada, Radio Canada Intl | | 9660as | 11730as | | | |
| 1200 | 1259 | | Poland, Radio Polonia | 6095eu | 7270eu | 9525eu | 11820eu | | |
| 1200 | 1300 | | Anguilla, Caribbean Beacon | | 11775am | | | | |
| 1200 | 1300 | vi | Australia, ABC/Alice Springs | | 2310do | | | | |
| 1200 | 1300 | vi | Australia, ABC/Katherine | | 2485do | | | | |
| 1200 | 1300 | vi | Australia, ABC/Tennant Creek | | 2325do | | | | |
| 1200 | 1300 | | Australia, Christian Voice Intl | | 13775pa | 15530as | 17725pa | | |
| 1200 | 1300 | | Australia, Radio | 6020va | 9475va | 9580va | 11650pa | 11880as | |
| | | | 15400as 21820va | | | | | | |
| 1200 | 1300 | | Bangladesh, Bangla Betar | | 7185as | 9550as | | | |
| 1200 | 1300 | vi | Botswana, Radio | 7255do | 9600do | | | | |
| 1200 | 1300 | | Canada, CBC Northern Service | | 9625do | | | | |
| 1200 | 1300 | | Canada, CFRX Toronto ON | | 6070do | | | | |
| 1200 | 1300 | | Canada, CFVP Calgary AB | | 6030do | | | | |
| 1200 | 1300 | | Canada, CHNX Halifax, NS | | 6130do | | | | |
| 1200 | 1300 | | Canada, CKZN St John's NF | | 6160do | | | | |
| 1200 | 1300 | | Canada, CKZU Vancouver BC | | 6160do | | | | |
| 1200 | 1300 | | China, Voice of Hope | 7460as | | | | | |
| 1200 | 1300 | | Costa Rica, R for Peace Intl | | 15040va | 21815usb | | | |
| 1200 | 1300 | | Costa Rica, University Network | | 5030am | 6150am | 7375am | 9724sa | |
| | | | 11870am 13749na | 17645as | | | | | |
| 1200 | 1300 | | Ecuador, HCJB | 12005am | 15115am | 21455usb | | | |
| 1200 | 1300 | as/vl | Eqt. Guinea, Radio East Africa | | 15185af | | | | |
| 1200 | 1300 | a/monthly | Finland, Scandy Weekend Radio | | 6170va | 11720va | | | |
| 1200 | 1300 | | Germany, Deutsche Welle | | 6140eu | | | | |
| 1200 | 1300 | | Germany, Overcomer Ministries | | 5975eu | | | | |
| 1200 | 1300 | | Germany, Voice of Hope | | 15715me | | | | |
| 1200 | 1300 | vi | Ghana, Ghana BC Corp | | 4915do | 6130do | | | |
| 1200 | 1300 | | Guyana, Voice of | 5950do | | | | | |
| 1200 | 1300 | as/vl | Italy, IRRS | 7120va | 7125al | | | | |
| 1200 | 1300 | | Jordan, Radio | 11690eu | 17680al | | | | |
| 1200 | 1300 | | Kenya, Kenya BC Corp | 4885irr | 4915irr | | | | |
| 1200 | 1300 | vi | Lesotho, Radio | 4800do | | | | | |
| 1200 | 1300 | | Liberia, R Liberia Intl | 6100do | | | | | |
| 1200 | 1300 | | Malaysia, Radio | 7295do | | | | | |
| 1200 | 1300 | | Namibia, NBC | 7165af | 7215af | | | | |
| 1200 | 1300 | | Netherlands, Radio | 5965na | 6045eu | 9860eu | | | |
| 1200 | 1300 | vi | Nigeria, Radio/Enugu | 6025do | | | | | |
| 1200 | 1300 | vi | Nigeria, Radio/Ibadan | 6050do | | | | | |
| 1200 | 1300 | vi | Nigeria, Radio/Kaduna | 4770do | 6090do | 7275do | 9570do | | |
| 1200 | 1300 | vi | Nigeria, Radio/Lagos | 4990do | 7285do | | | | |
| 1200 | 1300 | | Palau, KHBN/ VO Hope | 9965as | | | | | |
| 1200 | 1300 | vi | Papua New Guinea, NBC | | 4890do | 9675irr | | | |
| 1200 | 1300 | | Russia, University Network | | 17765as | | | | |
| 1200 | 1300 | | Singapore, R Singapore Intl | | 6150as | 9600as | | | |
| 1200 | 1300 | | Taiwan, R Taipei Intl | 7130pa | 9610pa | | | | |
| 1200 | 1300 | | UK, BBC World Service | 6190af | 6195as | 9740as | 11760me | 11940af | |
| | | | 12095eu 15310as | 15360as | 15485eu | 15565eu | 15575me | 17640eu | |
| | | | 17700as 17830af | 17885af | 21470af | | | | |
| 1200 | 1300 | | USA, Armed Forces Radio | | 6458usb | 12689usb | | | |
| 1200 | 1300 | | USA, KAIJ Dallas TX | 5755va | | | | | |

Shortwave Guide



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|------|--------|--------------------------------|---------|---------|---------|---------|--|
| 1200 | 1300 | USA, KTBN Salt Lk City UT | 7510na | | | | |
| 1200 | 1300 | USA, KWHR Naalehu HI 9930as | | | | | |
| 1200 | 1300as | USA, KWHR Naalehu HI 11565pa | | | | | |
| 1200 | 1300 | USA, Voice of America 6110as | 9645as | 9760as | 11705as | 11715as | |
| | | 15170me 15250as 15260me | 15455as | 17630af | | | |
| 1200 | 1300 | USA, WEWN Birmingham AL | 5825na | 7425na | 15375na | 15745eu | |
| 1200 | 1300 | USA, WHRI Noblesville IN | 6040na | 9495am | | | |
| 1200 | 1300 | USA, WINB Red Lion PA 13570am | 13595as | | | | |
| 1200 | 1300 | USA, WJCR Upton KY 7490am | | | | | |
| 1200 | 1300 | USA, WRMI Miami FL 9955am | | | | | |
| 1200 | 1300 | USA, WRNO New Orleans LA | 7395am | | | | |
| 1200 | 1300 | USA, WSHB Cyp Creek SC | 5915as | 6095am | 9980as | 11660am | |
| 1200 | 1300 | USA, WTJC Newport NC | 9370na | | | | |
| 1200 | 1300 | USA, WWCN Nashville TN | 5070na | 5935na | 7560na | 15685na | |
| 1200 | 1300 | Vanuatu, Radio | 3945do | 4960do | 7260do | | |
| 1200 | 1300 | Zambia, Christian Voice 9865do | | | | | |
| 1200 | 1300 | Zimbabwe, Zimbabwe BC Corp | 5975do | 6045do | | | |
| 1210 | 1300 | New Zealand, Radio NZ Intl | 6095pa | | | | |
| 1215 | 1300 | Egypt, Radio Cairo | 17595as | | | | |
| 1225 | 1300 | Sri Lanka, SLBC | 6005as | 9770as | 15425as | | |
| 1230 | 1257 | Vietnam, Voice of | 9840as | 12020as | | | |
| 1230 | 1300 | Austria, Radio Austria Intl | 6155eu | 13730eu | | | |
| 1230 | 1300 | Sweden, Radio | 18960na | | | | |
| 1230 | 1300 | Thailand, Radio | 9655as | 9810as | 11905as | | |
| 1230 | 1300 | Turkey, Voice of | 17690as | 17815eu | | | |
| 1245 | 1300 | a Seychelles, FEBA Radio | 15535me | | | | |
| 1245 | 1300 | USA, WYFR Okeechobee FL | 11830na | 11970na | 13695na | | |

1300 UTC - 9AM E / 8AM C / 6AM P

| | | | | | | | |
|------|------|---|---------|----------|----------|---------|---------|
| 1300 | 1310 | Turkmenistan, Turkmen Radio | 5015as | | | | |
| 1300 | 1315 | a Germany, Remnants Hope Minstr | 6110eu | | | | |
| 1300 | 1325 | Netherlands, Radio | 5965na | 6045eu | 9860eu | | |
| 1300 | 1330 | Australia, Radio | 6020na | 9475va | 9580va | 11650pa | 11880as |
| | | 15400as 21820va | | | | | |
| 1300 | 1330 | Egypt, Radio Cairo | 17595as | | | | |
| 1300 | 1330 | Germany, Voice of Hope | 15715me | | | | |
| 1300 | 1330 | Guam, KSDA/ AWR | 15660as | | | | |
| 1300 | 1330 | UAE, AWR Africa | 17630as | | | | |
| 1300 | 1345 | Turkey, Voice of | 17690as | 17815eu | | | |
| 1300 | 1356 | China, China Radio Intl | 9750na | 11760pa | 11900pa | 11980as | 13650va |
| | | 15180as | | | | | |
| 1300 | 1356 | North Korea, Voice of | 7505eu | 9335na | 11335eu | 11710na | |
| 1300 | 1400 | Anguilla, Caribbean Beacon | 11775am | | | | |
| 1300 | 1400 | vi Australia, ABC/ Alice Springs | 2310do | | | | |
| 1300 | 1400 | vi Australia, ABC/ Katherine | 2485do | | | | |
| 1300 | 1400 | vi Australia, ABC/ Tennant Creek | 2325do | | | | |
| 1300 | 1400 | Australia, Christian Voice Intl | 13660pa | 13775pa | 15155as | | |
| 1300 | 1400 | vi Botswana, Radio | 7255do | | | | |
| 1300 | 1400 | Canada, CBC Northern Service | 9625do | | | | |
| 1300 | 1400 | Canada, CFRX Toronto ON | 6070do | | | | |
| 1300 | 1400 | Canada, CFVP Calgary AB | 6030do | | | | |
| 1300 | 1400 | Canada, CHNX Halifax, NS | 6130do | | | | |
| 1300 | 1400 | Canada, CKZN St John's NF | 6160do | | | | |
| 1300 | 1400 | Canada, CKZU Vancouver BC | 6160do | | | | |
| 1300 | 1400 | Canada, Radio Canada Intl | 9515na | 13655na | 17710na | | |
| 1300 | 1400 | China, Voice of Hope | 7460as | | | | |
| 1300 | 1400 | Costa Rica, R for Peace Intl | 15040va | 21815usb | | | |
| 1300 | 1400 | Costa Rica, University Network | 5030am | 6150am | 7375am | 9724sa | |
| | | 11870am 13749na 17645as | | | | | |
| 1300 | 1400 | Ecuador, HCJB | 12005am | 15115am | 21455usb | | |
| 1300 | 1400 | as/vl Eqt. Guinea, Radio East Africa | 15185af | | | | |
| 1300 | 1400 | a/monthly Finland, Scandv Weekend Radio | 6170va | 11720va | | | |
| 1300 | 1400 | Germany, Deutsche Welle | 6140eu | | | | |
| 1300 | 1400 | Germany, Overcomer Ministries | 5975eu | 13810af | | | |
| 1300 | 1400 | as Germany, Remnants Hope Minstr | 6110eu | | | | |
| 1300 | 1400 | vi Ghana, Ghana BC Corp | 4915do | 6130do | | | |
| 1300 | 1400 | Guyana, Voice of | 5950do | | | | |
| 1300 | 1400 | as/vl Italy, IRRS | 7120va | 7125al | | | |
| 1300 | 1400 | Jordan, Radio | 11690eu | 17680al | | | |
| 1300 | 1400 | Kenya, Kenya BC Corp | 4885irr | 4915irr | | | |
| 1300 | 1400 | vi Lesotho, Radio | 4800do | | | | |
| 1300 | 1400 | Liberia, R Liberia Intl | 6100do | | | | |
| 1300 | 1400 | Malaysia, Radio | 7295do | | | | |
| 1300 | 1400 | Namibia, NBC | 7165af | 7215af | | | |
| 1300 | 1400 | occnsal New Zealand, Radio NZ Intl | 6095pa | | | | |
| 1300 | 1400 | vi Nigeria, Radio/Enugu | 6025do | | | | |
| 1300 | 1400 | vi Nigeria, Radio/Kaduna | 4770do | 6090do | 7275do | 9570do | |
| 1300 | 1400 | vi Nigeria, Radio/Lagos | 4990do | 7285do | | | |
| 1300 | 1400 | Palau, KHBN/ VO Hope | 9965as | | | | |
| 1300 | 1400 | vi Papua New Guinea, NBC | 4890do | 9675irr | | | |
| 1300 | 1400 | Russia, University Network | 17765as | | | | |
| 1300 | 1400 | as S Africa, Channel Africa | 11720af | 21725af | | | |
| 1300 | 1400 | Singapore, R Singapore Intl | 6150as | 9600as | | | |
| 1300 | 1400 | South Korea, R Korea Intl | 9570as | 13670om | | | |
| 1300 | 1400 | Sri Lanka, SLBC | 6005as | 9770as | 15425as | | |
| 1300 | 1400 | Uganda, Radio | 5026do | 7196do | | | |
| 1300 | 1400 | UK, BBC World Service | 6190af | 6195va | 9740as | 11760me | 11940af |
| | | 12095eu 15190am 15310as | 15360as | 15420af | 15485eu | 15565eu | |
| | | 15575me 17640eu 17700as | 17830af | 17885af | 21470af | | |
| 1300 | 1400 | USA, Armed Forces Radio | 6458usb | 12689usb | | | |
| 1300 | 1400 | USA, KAJI Dallas TX | 5755va | | | | |
| 1300 | 1400 | USA, KNLS Anchor Point AK | 9615as | | | | |
| 1300 | 1400 | USA, KTBN Salt Lk City UT | 7510na | | | | |
| 1300 | 1400 | USA, KWHR Naalehu HI 9930as | | | | | |
| 1300 | 1400 | as USA, KWHR Naalehu HI 11565pa | | | | | |
| 1300 | 1400 | USA, Voice of America 6110as | 9645as | 9760as | 11705as | 15170me | |
| | | 15260me 15455as 17630af | | | | | |
| 1300 | 1400 | USA, WBCQ Monticello ME | 17495na | | | | |

| | | | | | | | |
|------|------|--------------------------------|---------|---------|---------|---------|---------|
| 1300 | 1400 | USA, WEWN Birmingham AL | 11875na | 11530na | 11550na | 15375na | |
| | | 15745eu | | | | | |
| 1300 | 1400 | USA, WHRI Noblesville IN | 6040na | 15105am | | | |
| 1300 | 1400 | USA, WINB Red Lion PA 13570am | | | | | |
| 1300 | 1400 | USA, WJCR Upton KY 7490am | 13595as | | | | |
| 1300 | 1400 | USA, WRMI Miami FL 9955am | | | | | |
| 1300 | 1400 | USA, WRNO New Orleans LA | 7395am | | | | |
| 1300 | 1400 | USA, WSHB Cyp Creek SC | 6095na | 7485as | 9455am | | |
| 1300 | 1400 | USA, WTJC Newport NC | 9370na | | | | |
| 1300 | 1400 | USA, WWCN Nashville TN | 9475na | 13845na | 12160na | 15685na | |
| 1300 | 1400 | USA, WYFR Okeechobee FL | 11550as | 11740na | 11830na | 11970na | |
| | | 17510sa 17575sa | | | | | |
| 1300 | 1400 | Zambia, Christian Voice 9865do | | | | | |
| 1300 | 1400 | vi Zimbabwe, Zimbabwe BC Corp | 5975do | 6045do | | | |
| 1330 | 1350 | UAE, Emirates Radio | 13630eu | 13675eu | 15400eu | 21597eu | |
| 1330 | 1357 | Vietnam, Voice of | 7145eu | 9730eu | | | |
| 1330 | 1359 | Finland, YLE/Radio Finland | 15400na | 17660na | | | |
| 1330 | 1400 | Australia, Radio | 6020va | 9475as | 9580va | 11650pa | 11660as |
| | | 11880as 21820va | | | | | |
| 1330 | 1400 | Austria, Radio Austria Intl | 17855as | | | | |
| 1330 | 1400 | Germany, Voice of Hope | 15775as | | | | |
| 1330 | 1400 | Guam, KSDA/ AWR | 11755as | | | | |
| 1330 | 1400 | India, All India Radio | 11620as | 13710as | | | |
| 1330 | 1400 | Laos, Lao National Radio | 7145as | | | | |
| 1330 | 1400 | Sweden, Radio | 9430va | 17505va | 18960na | | |
| 1330 | 1400 | UAE, AWR Africa | 15385as | | | | |
| 1330 | 1400 | Uzbekistan, Radio Tashkent | 5060as | 5955as | 5975as | 6025as | |
| | | 9715as | | | | | |
| 1330 | 1400 | Yugoslavia, Radio | 11835au | | | | |
| 1345 | 1400 | f Greece, Voice of | 9420eu | 9590na | 15630eu | 15650as | |

1400 UTC - 10AM E / 9AM C / 7AM P

| | | | | | | | |
|------|------|---|---------|----------|----------|---------|-----------|
| 1400 | 1427 | Czech Rep, Radio Prague Intl | 21745va | | | | |
| 1400 | 1430 | Ecuador, HCJB | 12005am | 15115am | 21455usb | | |
| 1400 | 1430 | Mexico, Radio Mexico Intl | 9705am | 11770am | | | |
| 1400 | 1430 | Thailand, Radio | 9530as | 9655as | 11905as | | |
| 1400 | 1430 | s USA, Voice of America | 18275as | | | | |
| 1400 | 1455 | as S Africa, Channel Africa | 11720af | 17780af | 21725af | | |
| 1400 | 1456 | China, China Radio Intl | 7405na | 9700as | 11675as | 11765va | 13650va |
| | | 13685af 15125af 17720na | | | | | |
| 1400 | 1500 | Anguilla, Caribbean Beacon | 11775am | | | | |
| 1400 | 1500 | vi Australia, ABC/ Alice Springs | 2310do | | | | |
| 1400 | 1500 | vi Australia, ABC/ Katherine | 2485do | | | | |
| 1400 | 1500 | vi Australia, ABC/ Tennant Creek | 2325do | | | | |
| 1400 | 1500 | Australia, Christian Voice Intl | 13660pa | 13775pa | 15155as | | |
| 1400 | 1500 | Australia, Radio | 5995va | 6080pa | 9580va | 11650pa | |
| 1400 | 1500 | vi Botswana, Radio | 7255do | | | | |
| 1400 | 1500 | Canada, CBC Northern Service | 9625do | | | | |
| 1400 | 1500 | Canada, CFRX Toronto ON | 6070do | | | | |
| 1400 | 1500 | Canada, CFVP Calgary AB | 6030do | | | | |
| 1400 | 1500 | Canada, CHNX Halifax, NS | 6130do | | | | |
| 1400 | 1500 | Canada, CKZN St John's NF | 6160do | | | | |
| 1400 | 1500 | Canada, CKZU Vancouver BC | 6160do | | | | |
| 1400 | 1500 | Canada, Radio Canada Intl | 9515na | 13655na | 17710na | | |
| 1400 | 1500 | China, Voice of Hope | 7460as | | | | |
| 1400 | 1500 | Costa Rica, R for Peace Intl | 15040va | 21815usb | | | |
| 1400 | 1500 | Costa Rica, University Network | 5030am | 6150am | 7375am | 9724sa | |
| | | 11870am 13749na 17645as | | | | | |
| 1400 | 1500 | as/vl Eqt. Guinea, Radio East Africa | 15185af | | | | |
| 1400 | 1500 | a/monthly Finland, Scandv Weekend Radio | 6170va | 11720va | | | |
| 1400 | 1500 | France Radio France Intl | 9580as | 11600me | 17620me | | |
| 1400 | 1500 | Germany, Deutsche Welle | 6140eu | | | | |
| 1400 | 1500 | Germany, Overcomer Ministries | 5975eu | 13810af | | | |
| 1400 | 1500 | Germany, Voice of Hope | 15775as | | | | |
| 1400 | 1500 | vi Ghana, Ghana BC Corp | 4915do | 6130do | | | |
| 1400 | 1500 | Guyana, Voice of | 5950do | | | | |
| 1400 | 1500 | India, All India Radio | 11620as | 13710as | | | |
| 1400 | 1500 | as/vl Italy, IRRS | 7120va | 7125al | | | |
| 1400 | 1500 | Japan, Radio 7200as | 9505na | 9845as | 17755va | | |
| 1400 | 1500 | Jordan, Radio | 11690eu | 17680al | | | |
| 1400 | 1500 | Kenya, Kenya BC Corp | 4885irr | 4915irr | | | |
| 1400 | 1500 | vi Lesotho, Radio | 4800do | | | | |
| 1400 | 1500 | Liberia, R Liberia Intl | 6100do | | | | |
| 1400 | 1500 | Malaysia, Radio | 7295do | | | | |
| 1400 | 1500 | Malaysia, RTM Sarawak | 7160do | | | | |
| 1400 | 1500 | Namibia, NBC | 7165af | 7215af | | | |
| 1400 | 1500 | occnsal New Zealand, Radio NZ Intl | 6095pa | | | | |
| 1400 | 1500 | vi Nigeria, Radio/Enugu | 6025do | | | | |
| 1400 | 1500 | vi Nigeria, Radio/Ibadan | 6050do | | | | |
| 1400 | 1500 | vi Nigeria, Radio/Kaduna | 4770do | 6090do | 7275do | 9570do | |
| 1400 | 1500 | vi Nigeria, Radio/Lagos | 4990do | 7285do | | | |
| 1400 | 1500 | Oman, Radio | 15140va | | | | |
| 1400 | 1500 | Palau, KHBN/ VO Hope | 9965as | | | | |
| 1400 | 1500 | Romania, R Romania Intl | 11940eu | 15365eu | 17790eu | | |
| 1400 | 1500 | Russia, University Network | 17765as | | | | |
| 1400 | 1500 | Russia, Voice of Russia | 6205as | 7260na | 7350as | 9875as | 11500as</ |

Shortwave Guide



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|------|------|--------|--------------------------------|---------|---------|---------|---------|
| 1400 | 1500 | as | USA, KWHR Naalehu HI9930as | | | | |
| 1400 | 1500 | | USA, KWHR Naalehu HI11565pa | | | | |
| 1400 | 1500 | | USA, Voice of America 6110as | 7125as | 9645as | 9760as | 11705as |
| | | | 15205as 15395as 15455as | | | | |
| 1400 | 1500 | | USA, WBCQ Monticello ME | 17495na | | | |
| 1400 | 1500 | | USA, WEWN Birmingham AL | 11875na | 11530na | 11550na | 15375na |
| | | | 15745eu | | | | |
| 1400 | 1500 | | USA, WHRI Noblesville IN | 6040na | 15105am | | |
| 1400 | 1500 | | USA, WINB Red Lion PA 13570am | | | | |
| 1400 | 1500 | | USA, WJCR Upton KY 7490am | 13595as | | | |
| 1400 | 1500 | smtwhf | USA, WRMI Miami FL 15725na | | | | |
| 1400 | 1500 | | USA, WRNO New Orleans LA | 7395am | | | |
| 1400 | 1500 | | USA, WTJC Newport NC | 9370na | | | |
| 1400 | 1500 | | USA, WWCR Nashville TN | 9475na | 12160na | 13845na | 15685na |
| 1400 | 1500 | | USA, WYFR Okeechobee FL | 11550as | 11740na | 11830na | 17510sa |
| | | | 17575sa 17760na | | | | |
| 1400 | 1500 | | Zambia, Christian Voice 9865do | | | | |
| 1400 | 1500 | vi | Zimbabwe, Zimbabwe BC Corp | 5975do | 6045do | | |
| 1415 | 1420 | | Nepal, Radio3230as | 5005as | | | |
| 1430 | 1500 | | Austria, Radio Austria Intl | 6155eu | 13730eu | | |
| 1430 | 1500 | | Guam, KSDA/ AWR | 15660as | | | |
| 1430 | 1500 | | Guam, KTWK/ TWR | 15330as | | | |
| 1430 | 1500 | | Malaysia, RTM Kota Kinabalu | 5980do | | | |
| 1430 | 1500 | | Myanmar, Radio | 5985do | | | |
| 1430 | 1500 | | Netherlands, Radio | 12070as | 12080as | 15220na | 15595as |
| 1430 | 1500 | | Sweden, Radio | 9430af | 17505va | 18960na | |
| 1445 | 1500 | f | Seychelles, FEBA Radio | 11600as | | | |

1500 UTC - 11AM E / 10AM C / 8AM P

| | | | | | | | |
|------|------|-----------|---------------------------------|---------|----------|---------|---------|
| 1500 | 1530 | | Australia, Radio | 5995va | 6080pa | 9580va | 11650pa |
| 1500 | 1530 | | Mexico, Radio Mexico Intl | 9705am | 11770am | | |
| 1500 | 1530 | | S Africa, Channel Africa | 17770af | | | |
| 1500 | 1530 | h | Seychelles, FEBA Radio | 11600as | | | |
| 1500 | 1530 | | USA, Voice of America | 7125as | 9645as | 15205as | 15395as |
| 1500 | 1530 | smtwhf | USA, WRMI Miami FL | 15725na | | | |
| 1500 | 1535 | | Germany, Voice of Hope | 15775as | | | |
| 1500 | 1556 | | China, China Radio Intl | 7160as | 9785as | 13685af | 15125af |
| | | | 17720na | | | | |
| 1500 | 1556 | | North Korea, Voice of | 7505eu | 9335na | 11335eu | 11710na |
| 1500 | 1600 | | Anguilla, Caribbean Beacon | 11775am | | | |
| 1500 | 1600 | vi | Australia, ABC/Alice Springs | 2310do | | | |
| 1500 | 1600 | vi | Australia, ABC/Katherine | 2485do | | | |
| 1500 | 1600 | vi | Australia, ABC/Tennant Creek | 2325do | | | |
| 1500 | 1600 | | Australia, Christian Voice Intl | 13660pa | 13775pa | 15155as | |
| 1500 | 1600 | vi | Austria, Radio Africa Intl | 17895eu | | | |
| 1500 | 1600 | vi | Botswana, Radio | 7255do | 9600do | | |
| 1500 | 1600 | | Canada, CBC Northern Service | 9625do | | | |
| 1500 | 1600 | | Canada, CFRX Toronto ON | 6070do | | | |
| 1500 | 1600 | | Canada, CFVP Calgary AB | 6030do | | | |
| 1500 | 1600 | | Canada, CHNX Halifax, NS | 6130do | | | |
| 1500 | 1600 | | Canada, CKZN St John's NF | 6160do | | | |
| 1500 | 1600 | | Canada, CKZU Vancouver BC | 6160do | | | |
| 1500 | 1600 | | Canada, Radio Canada Intl | 17820as | 13655na | 15360as | 17710na |
| 1500 | 1600 | | China, Voice of Hope | 7460as | | | |
| 1500 | 1600 | | Costa Rica, R for Peace Intl | 15040va | 21815usb | | |
| 1500 | 1600 | | Costa Rica, University Network | 5030am | 6150am | 7375am | 9724sa |
| | | | 11870am 13749na 17645as | | | | |
| 1500 | 1600 | as/vl | Eat. Guinea, Radio East Africa | 15185af | | | |
| 1500 | 1600 | a/monthly | Finland, Scandv Weekend Radio | 5990va | 11720va | | |
| 1500 | 1600 | | Germany, Deutsche Welle | 6140eu | | | |
| 1500 | 1600 | | Germany, Overcomer Ministries | 5975eu | 13810af | | |
| 1500 | 1600 | a | Germany, Overcomer Ministries | 6110af | | | |
| 1500 | 1600 | vi | Ghana, Ghana BC Corp | 4915do | 6130do | | |
| 1500 | 1600 | | Guam, KTWK/ TWR | 15330as | | | |
| 1500 | 1600 | | Guyana, Voice of | 5950do | | | |
| 1500 | 1600 | | Italy, IRRS | 7120va | 7125af | | |
| 1500 | 1600 | | Japan, Radio7200as | 9505na | 9750as | 9845as | 17755va |
| 1500 | 1600 | | Jordan, Radio | 11690na | 4915irr | | |
| 1500 | 1600 | | Kenya, Kenya BC Corp | 4885irr | | | |
| 1500 | 1600 | vi | Lesotho, Radio | 4800do | | | |
| 1500 | 1600 | | Liberia, R Liberia Intl | 6100do | | | |
| 1500 | 1600 | | Malaysia, Radio | 7295do | | | |
| 1500 | 1600 | | Malaysia, RTM Kota Kinabalu | 5980do | | | |
| 1500 | 1600 | | Malaysia, RTM Sarawak | 7160do | | | |
| 1500 | 1600 | | Myanmar, Radio | 5985do | | | |
| 1500 | 1600 | | Namibia, NBC | 7165af | 7215af | | |
| 1500 | 1600 | | Netherlands, Radio | 12070as | 12080as | 15220na | 15595as |
| 1500 | 1600 | occsnal | New Zealand, Radio NZ Intl | 6095pa | | | |
| 1500 | 1600 | vi | Nigeria, Radio/Enugu | 6025do | | | |
| 1500 | 1600 | vi | Nigeria, Radio/Ibadan | 6050do | | | |
| 1500 | 1600 | vi | Nigeria, Radio/Kaduna | 4770do | 6090do | 7275do | 9570do |
| 1500 | 1600 | vi | Nigeria, Radio/Lagos | 4990do | 7285do | | |
| 1500 | 1600 | | Russia, University Network | 17765as | | | |
| 1500 | 1600 | | Russia, Voice of Russia | 4940as | 4965as | 6005me | 7260na |
| | | | 9830me 15735am | | | | 7305as |
| 1500 | 1600 | | Russia, World Beacon | 15340eu | | | |
| 1500 | 1600 | | Singapore, SBC Radio One | 6150do | | | |
| 1500 | 1600 | | Sri Lanka, SLBC | 6005as | 7197as | 15425as | |
| 1500 | 1600 | | Uganda, Radio | 5026do | | | |
| 1500 | 1600 | | UK, BBC World Service | 5975as | 6135as | 6190af | 6195as |
| | | | 9740as 11860af 11940af | | | | 9410eu |
| | | | 15485eu 15565eu 17700as | | | | 15420af |
| | | | | | | | 21470af |
| | | | | | | | 21660af |
| 1500 | 1600 | | UK, World Beacon | 15340eu | | | |
| 1500 | 1600 | | USA, Armed Forces Radio | 6458usb | 12689usb | | |
| 1500 | 1600 | | USA, KAJI Dallas TX | 13815va | | | |
| 1500 | 1600 | | USA, KJES Vado NM | 11715na | | | |
| 1500 | 1600 | | USA, KTBN Salt Lk City UT | 7510na | | | |

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|------|------|-------|--------------------------------|---------|---------|---------|---------|
| 1500 | 1600 | | USA, KWHR Naalehu HI9930as | | | | |
| 1500 | 1600 | as | USA, KWHR Naalehu HI11565pa | | | | |
| 1500 | 1600 | | USA, VOA Special English | 6110as | 9760as | 12040as | 15460as |
| 1500 | 1600 | | USA, WBCQ Monticello ME | 9335na | 17495na | | |
| 1500 | 1600 | | USA, WEWN Birmingham AL | 11875na | 11530na | 11550na | 15375na |
| | | | 15745eu | | | | |
| 1500 | 1600 | | USA, WHRI Noblesville IN | 6040na | 15105am | | |
| 1500 | 1600 | | USA, WINB Red Lion PA 13570am | | | | |
| 1500 | 1600 | | USA, WJCR Upton KY 7490am | 13595as | | | |
| 1500 | 1600 | | USA, WRNO New Orleans LA | 7395am | | | |
| 1500 | 1600 | | USA, WTJC Newport NC | 9370na | | | |
| 1500 | 1600 | | USA, WWCR Nashville TN | 9475na | 12160na | 13845na | 15685na |
| 1500 | 1600 | | USA, WYFR Okeechobee FL | 6280as | 11830na | 15525as | 17760na |
| 1500 | 1600 | | Zambia, Christian Voice 4965do | | | | |
| 1500 | 1600 | vi | Zimbabwe, Zimbabwe BC Corp | 5975do | 6045do | | |
| 1515 | 1545 | twf | Seychelles, FEBA Radio | 11600as | | | |
| 1515 | 1600 | m | Seychelles, FEBA Radio | 11600as | | | |
| 1530 | 1600 | | Australia, Radio | 5995va | 6080pa | 9475as | 9580va |
| 1530 | 1600 | vi | Botswana, Radio | 3356do | 4820do | 7255do | |
| 1530 | 1600 | | Iran, VO Islamic Rep. of Iran | 9605as | 11640eu | 11870as | |
| 1530 | 1600 | as | Seychelles, FEBA Radio | 11600as | | | |
| 1530 | 1600 | | USA, Voice of America | 7125as | 9575as | 9645as | 11955me |
| | | | 15120me 15205as 15265me | | 15395as | | 13735me |
| 1530 | 1600 | mtwhf | USA, WRMI Miami FL | 15725na | | | |
| 1540 | 1545 | | Turkmenistan, Turkmen Radio | 4930as | | | |
| 1550 | 1600 | | Vatican City, Vatican Radio | 9865au | 13765au | 15235au | |

1600 UTC - 12PM E / 11AM C / 9AM P

| | | | | | | | |
|------|------|-----------|---------------------------------|---------|----------|----------|---------|
| 1600 | 1610 | | Vatican City, Vatican Radio | 9865au | 13765au | 15235au | |
| 1600 | 1615 | | Pakistan, Radio | 11570me | 15100me | 15725af | 17750af |
| 1600 | 1625 | | Netherlands, Radio | 12070as | 12080as | 15220na | 15595as |
| 1600 | 1627 | | Iran, VO Islamic Rep. of Iran | 9605as | 11640eu | 11870as | |
| 1600 | 1627 | | Vietnam, Voice of | 7145eu | 9730eu | | |
| 1600 | 1630 | | Israel, Kol Israel | 11605va | 17545va | | |
| 1600 | 1630 | | Jordan, Radio | 11690na | 17680af | | |
| 1600 | 1630 | mtwhfa | Malta, VO Mediterranean | 6110eu | 9840eu | | |
| 1600 | 1630 | | S Africa, Channel Africa 9525af | | | | |
| 1600 | 1630 | vi | Zimbabwe, Zimbabwe BC Corp | 5975do | 6045do | | |
| 1600 | 1640 | | UAE, Emirates Radio | 13630eu | 13675eu | 15400eu | 21597al |
| 1600 | 1645 | a/monthly | Finland, Scandv Weekend Radio | 5990va | 11720va | | |
| 1600 | 1645 | | Germany, Deutsche Welle | 6170as | 7225as | 9735af | 11695as |
| | | | 13605as 15455af 21840af | | | | |
| 1600 | 1650 | occsnal | New Zealand, Radio NZ Intl | 6095pa | | | |
| 1600 | 1656 | | China, China Radio Intl | 7190af | 13650af | | |
| 1600 | 1656 | | North Korea, Voice of | 9975af | 11735af | | |
| 1600 | 1659 | as | Canada, Radio Canada Intl | 9515na | 13655na | 17710na | |
| 1600 | 1700 | | Algeria, Radio Algiers Intl | 11715eu | 15160eu | | |
| 1600 | 1700 | | Anguilla, Caribbean Beacon | 11775am | | | |
| 1600 | 1700 | vi | Australia, ABC/Alice Springs | 2310do | | | |
| 1600 | 1700 | vi | Australia, ABC/Katherine | 2485do | | | |
| 1600 | 1700 | vi | Australia, ABC/Tennant Creek | 2325do | | | |
| 1600 | 1700 | | Australia, Christian Voice Intl | 7170pa | 13660pa | 15115as | |
| 1600 | 1700 | | Australia, Radio | 5995va | 6080pa | 11650pa | 11660va |
| 1600 | 1700 | vi | Botswana, Radio | 3356do | 4820do | 7255do | |
| 1600 | 1700 | | Canada, CBC Northern Service | 9625do | | | |
| 1600 | 1700 | | Canada, CFRX Toronto ON | 6070do | | | |
| 1600 | 1700 | | Canada, CFVP Calgary AB | 6030do | | | |
| 1600 | 1700 | | Canada, CHNX Halifax, NS | 6130do | | | |
| 1600 | 1700 | | Canada, CKZN St John's NF | 6160do | | | |
| 1600 | 1700 | | Canada, CKZU Vancouver BC | 6160do | | | |
| 1600 | 1700 | | Costa Rica, R for Peace Intl | 15040va | 21815usb | | |
| 1600 | 1700 | | Costa Rica, University Network | 5030am | 6150am | 7375am | 9724sa |
| | | | 11870am 13749na | | | | |
| 1600 | 1700 | | Ethiopia, Radio | 5990do | 7110af | 7165af | 9560af |
| | | | 11800af | | | | 9704af |
| 1600 | 1700 | | France Radio France Intl | 11615af | 11995af | 12015af | 15605af |
| | | | 17850af | | | | 17605af |
| 1600 | 1700 | | Germany, Deutsche Welle | 6140eu | | | |
| 1600 | 1700 | a | Germany, Voice of Hope | 15715af | | | |
| 1600 | 1700 | vi | Ghana, Ghana BC Corp | 4915do | 6130do | | |
| 1600 | 1700 | | Guyana, Voice of | 5950do | | | |
| 1600 | 1700 | | Kenya, Kenya BC Corp | 4885irr | 4915irr | | |
| 1600 | 1700 | vi | Lesotho, Radio | 4800do | | | |
| 1600 | 1700 | | Liberia, R Liberia Intl | 6100do | | | |
| 1600 | 1700 | | Malaysia, Radio | 7295do | | | |
| 1600 | 1700 | | Namibia, NBC | 7165af | 7215af | | |
| 1600 | 1700 | vi | Nigeria, Radio/Enugu | 6025do | | | |
| 1600 | 1700 | vi | Nigeria, Radio/Ibadan | 6050do | | | |
| 1600 | 1700 | vi | Nigeria, Radio/Kaduna | 4770do | 6090do | 7275do | 9570do |
| 1600 | 1700 | vi | Nigeria, Radio/Lagos | 3326do | 4990do | | |
| 1600 | 1700 | | Russia, University Network | 17765as | | | |
| 1600 | 1700 | | Russia, Voice of Russia | 5980me | 7260na | 9470me | 9830me |
| 1600 | 1700 | | Russia, World Beacon | 15340eu | | | 15735am |
| 1600 | 1700 | | South Korea, R Korea Intl | 5975om | 9515af | 9870af | |
| 1600 | 1700 | | Taiwan, R Taipei Intl | 11550as | | | |
| 1600 | 1700 | | Uganda, Radio | 5026do | 7196do | | |
| 1600 | 1700 | | UK, BBC World Service | 3915as | 5975as | 6190af | 6195as |
| | | | 9410eu 9740as | 12095e | 15190am | 15310as | 7160as |
| | | | 15565eu 17700as | 17830af | 21470af | 21660af | 15400af |
| 1600 | 1700 | | UK, World Beacon | 15340eu | | | |
| 1600 | 1700 | | USA, Armed Forces Radio | | 6458usb | 12689usb | |
| 1600 | 1700 | | USA, KAJI Dallas TX | 13815va | | | |
| 1600 | 1700 | | USA, KJES Vado NM | 11715na | | | |
| 1600 | 1700 | | USA, KTVB Salt Lk City UT | | 15590na | | |
| 1600 | 1700 | | USA, KWHR Naalehu HI | 9930as | | | |
| 1600 | 1700 | | USA, VOA Special English | | 13600af | 15445af | 17640af |
| 1600 | 1700 | | USA, Voice of America | 6035af | 6110as | 7125as | 9575as |
| | | | | | | | 9645as |

Shortwave Guide



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|------|------|-----------|--------------------------------|---------|---------|---------|---------|---------|---------|--|--|
| | | | 9760as | 11950me | 13710af | 13735me | 15120me | 15205as | 15240af | | |
| | | | 15395as | 15485af | 17715af | 17895af | | | | | |
| 1600 | 1700 | | USA, WBCQ Monticello ME | | | 9335na | 17495na | | | | |
| 1600 | 1700 | | USA, WEWN Birmingham AL | | | 11530na | 11550na | 13615na | 15375na | | |
| | | | 15745eu | | | | | | | | |
| 1600 | 1700 | | USA, WHRA Greenbush ME | | | 17650af | | | | | |
| 1600 | 1700 | | USA, WHRI Noblesville IN | | | 13760va | 15105am | | | | |
| 1600 | 1700 | | USA, WINB Red Lion PA 13570am | | | | | | | | |
| 1600 | 1700 | | USA, WJCR Upton KY 7490am | | | 13595as | | | | | |
| 1600 | 1700 | mtwhf | USA, WRMI Miami FL 15725na | | | | | | | | |
| 1600 | 1700 | | USA, WRNO New Orleans LA | | | 7395am | 15420am | | | | |
| 1600 | 1700 | | USA, WSHB Cyp Creek SC | | | 18910af | | | | | |
| 1600 | 1700 | | USA, WTJC Newport NC | | | 9370na | | | | | |
| 1600 | 1700 | | USA, WWCN Nashville TN | | | 9475na | 12160na | 13845na | 15685na | | |
| 1600 | 1700 | | USA, WYFR Okeechobee FL | | | 11830na | 13855af | 15525as | 17760na | | |
| | | | 18980eu | 21455eu | 21525af | | | | | | |
| 1600 | 1700 | | Zambia, Christian Voice 4965do | | | | | | | | |
| 1615 | 1630 | | Vatican City, Vatican Radio | | | 4005eu | 5885eu | 7250eu | 9645eu | | |
| | | | 15595eu | | | | | | | | |
| 1615 | 1700 | as | UK, BBC World Service 11860af | | | 15420af | 21490af | | | | |
| 1630 | 1700 | | Austria, Radio Austria Intl | | | 17865na | | | | | |
| 1630 | 1700 | | Egypt, Radio Cairo | | | 12555af | | | | | |
| 1630 | 1700 | | Georgia, Georgian Radio | | | 6180me | | | | | |
| 1630 | 1700 | | Guam, KSDA/ AWR | | | 11980as | | | | | |
| 1630 | 1700 | | Slovakia, R Slovakia Intl | | | 5915eu | | | | | |
| 1630 | 1700 | | UAE, AWR Africa | | | 9890af | | | | | |
| 1630 | 1700 | as | UK, BBC World Service 11860af | | | 21490af | | | | | |
| 1630 | 1700 | vi | Zimbabwe, Zimbabwe BC Corp | | | 4828do | 6045do | | | | |
| 1645 | 1700 | a/monthly | Finland, Scandv Weekend Radio | | | 6170va | 11720va | | | | |
| 1645 | 1700 | | Tajikistan, Radio | | | 7245as | | | | | |
| 1650 | 1700 | mtwhf | New Zealand, Radio NZ Intl | | | 11980pa | | | | | |

1700 UTC - 1PM E / 12PM C / 10AM P

| | | | | | | | | | | | |
|------|------|-----------|----------------------------------|--|--|---------|----------|---------|---------|---------|--|
| 1700 | 1727 | | Czech Rep, Radio Prague Intl | | | 5930eu | 17485eu | | | | |
| 1700 | 1727 | | Vietnam, Voice of | | | 12070eu | | | | | |
| 1700 | 1730 | a/monthly | Finland, Scandv Weekend Radio | | | 6170va | 11720va | | | | |
| 1700 | 1730 | | France Radio France Intl 11615af | | | 15605af | 17605af | | | | |
| 1700 | 1730 | | Germany, Deutsche Welle | | | 3995eu | | | | | |
| 1700 | 1730 | | S Africa, Channel Africa 17870af | | | | | | | | |
| 1700 | 1756 | | China, China Radio Intl 7150af | | | 9570af | 9670va | 9695af | 11910af | | |
| 1700 | 1759 | | Poland, Radio Polonia 5995eu | | | 7285eu | | | | | |
| 1700 | 1800 | | Anguilla, Caribbean Beacon | | | 11775am | | | | | |
| 1700 | 1800 | vi | Australia, ABC/Alice Springs | | | 2310do | | | | | |
| 1700 | 1800 | vi | Australia, ABC/Katherine | | | 2485do | | | | | |
| 1700 | 1800 | vi | Australia, ABC/Tennant Creek | | | 2325do | | | | | |
| 1700 | 1800 | | Australia, Christian Voice Intl | | | 7170pa | 13660pa | 15115as | | | |
| 1700 | 1800 | | Australia, Radio | | | 5995va | 6080pa | 9475as | 9580va | 11880va | |
| 1700 | 1800 | vi | Botswana, Radio | | | 3356do | 7255do | | | | |
| 1700 | 1800 | | Canada, CBC Northern Service | | | 9625do | | | | | |
| 1700 | 1800 | | Canada, CFRX Toronto ON | | | 6070do | | | | | |
| 1700 | 1800 | | Canada, CFVP Calgary AB | | | 6030do | | | | | |
| 1700 | 1800 | | Canada, CHNX Halifax, NS | | | 6130do | | | | | |
| 1700 | 1800 | | Canada, CKZN St John's NF | | | 6160do | | | | | |
| 1700 | 1800 | | Canada, CKZU Vancouver BC | | | 6160do | | | | | |
| 1700 | 1800 | | Costa Rica, R for Peace Intl | | | 15040va | 21815usb | | | | |
| 1700 | 1800 | | Costa Rica, University Network | | | 5030am | 6150am | 7375am | 9724sa | | |
| | | | 11870am 13749na 17645as | | | | | | | | |
| 1700 | 1800 | | Egypt, Radio Cairo | | | 15255af | | | | | |
| 1700 | 1800 | mtwhf | Eat Guinea, Radio Africa | | | 15185af | | | | | |
| 1700 | 1800 | | Germany, Deutsche Welle | | | 6140eu | | | | | |
| 1700 | 1800 | a | Germany, Overcomer Ministries | | | 6110af | | | | | |
| 1700 | 1800 | | Germany, Unt. Methodist Church | | | 11735af | 13820af | | | | |
| 1700 | 1800 | | Germany, Voice of Hope | | | 9815eu | | | | | |
| 1700 | 1800 | vi | Ghana, Ghana BC Corp | | | 3366do | 4915do | | | | |
| 1700 | 1800 | a | Greece, Voice of | | | 9420eu | 15630eu | 17705na | | | |
| 1700 | 1800 | | Guyana, Voice of | | | 5950do | | | | | |
| 1700 | 1800 | | Japan, Radio 9505na | | | 11970eu | 15355af | | | | |
| 1700 | 1800 | | Kenya, Kenya BC Corp | | | 4885irr | 4915irr | | | | |
| 1700 | 1800 | vi | Lesotho, Radio | | | 4800do | | | | | |
| 1700 | 1800 | | Liberia, R Liberia Intl | | | 6100do | | | | | |
| 1700 | 1800 | | Namibia, NBC | | | 3270af | 3290af | 7215irr | | | |
| 1700 | 1800 | mtwhf | New Zealand, Radio NZ Intl | | | 11980pa | | | | | |
| 1700 | 1800 | vi | Nigeria, Radio/Enugu | | | 6025do | | | | | |
| 1700 | 1800 | vi | Nigeria, Radio/Ibadan | | | 6050do | | | | | |
| 1700 | 1800 | vi | Nigeria, Radio/Kaduna | | | 4770do | 6090do | 7275do | 9570do | | |
| 1700 | 1800 | vi | Nigeria, Radio/Lagos | | | 3326do | 4990do | | | | |
| 1700 | 1800 | | Romania, R Romania Intl | | | 9625af | 11830eu | 11940eu | 15245eu | | |
| 1700 | 1800 | | Russia, University Network | | | 17765as | | | | | |
| 1700 | 1800 | | Russia, Voice of Russia | | | 7260na | 7335af | 7340eu | 9775eu | 9830af | |
| | | | 11510af 11510af 15735am | | | | | | | | |
| 1700 | 1800 | as | Russia, Voice of Russia | | | 5940eu | 6175eu | | | | |
| 1700 | 1800 | | Russia, World Beacon | | | 9575eu | | | | | |
| 1700 | 1800 | | Sierra Leone, SLBS | | | 3316do | | | | | |
| 1700 | 1800 | | Taiwan, R Taipei Intl | | | 11550as | | | | | |
| 1700 | 1800 | | Uganda, Radio | | | 5026do | 7196do | | | | |
| 1700 | 1800 | | UK, BBC World Service | | | 3255af | 3915as | 5975as | 6005af | 6190af | |
| | | | 6195eu 7160as 9410eu | | | 9510as | 9630af | 9740as | 15400af | | |
| | | | 15420af 15565as 17830af | | | | 21470af | | | | |
| | | | UK, World Beacon | | | 9575eu | | | | | |
| 1700 | 1800 | | USA, Armed Forces Radio | | | 6458usb | 12689usb | | | | |
| 1700 | 1800 | | USA, KAJI Dallas TX | | | 13815va | | | | | |
| 1700 | 1800 | | USA, KTBN Salt Lk City UT | | | 15590na | | | | | |
| 1700 | 1800 | | USA, KWHR Naalehu HI 9930as | | | | | | | | |
| 1700 | 1800 | | USA, Voice of America | | | 6040af | 6110as | 7125as | 9645as | 9760as | |
| | | | 13710af 15205as 15240af | | | 15395as | 15445af | 17895af | | | |
| 1700 | 1800 | mtwhf | USA, Voice of America | | | 5990as | 6045as | 9525as | 9670as | 9795as | |
| | | | 11955as 12005as 15255as | | | | | | | | |
| 1700 | 1800 | | USA, WBCQ Monticello ME | | | 9335na | 17495na | | | | |

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|------|------|-----------|--------------------------------|--|--|----------|----------|---------|---------|---------|--|
| 1700 | 1800 | | USA, WEWN Birmingham AL | | | 11530na | 11550na | 13615na | 15745na | | |
| | | | 17595eu | | | | | | | | |
| 1700 | 1800 | | USA, WHRA Greenbush ME | | | 17650af | | | | | |
| 1700 | 1800 | | USA, WHRI Noblesville IN | | | 13760va | 15105am | | | | |
| 1700 | 1800 | | USA, WINB Red Lion PA 13570am | | | | | | | | |
| 1700 | 1800 | | USA, WJCR Upton KY 7490am | | | 13595as | | | | | |
| 1700 | 1800 | | USA, WMLK Bethel PA 15265eu | | | | | | | | |
| 1700 | 1800 | mtwhf | USA, WRMI Miami FL 15725na | | | | | | | | |
| 1700 | 1800 | | USA, WRNO New Orleans LA | | | 7395am | 15420am | | | | |
| 1700 | 1800 | | USA, WSHB Cyp Creek SC | | | 18910af | | | | | |
| 1700 | 1800 | | USA, WTJC Newport NC | | | 9370na | | | | | |
| 1700 | 1800 | | USA, WWCN Nashville TN | | | 9475na | 12160na | 13845na | 15685na | | |
| 1700 | 1800 | | USA, WWRB Manchester TN | | | 9320va | 12172va | | | | |
| 1700 | 1800 | | USA, WYFR Okeechobee FL | | | 13855af | 18980eu | 21455eu | | | |
| 1700 | 1800 | | Zambia, Christian Voice 4965do | | | | | | | | |
| 1700 | 1800 | vi | Zimbabwe, Zimbabwe BC Corp | | | 4828do | 6045do | | | | |
| 1710 | 1725 | | Armenia, TWR | | | 5855eu | | | | | |
| 1725 | 1745 | mtwhf/vl | UK, United Nations Radio | | | 6125af | 15495me | 17580af | | | |
| 1730 | 1745 | vi | Libya, Voice of Africa | | | 15435irr | 17750irr | | | | |
| 1730 | 1745 | | Swaziland, TWR | | | 9500af | | | | | |
| 1730 | 1755 | mtwhf | Swaziland, TWR | | | 3200af | | | | | |
| 1730 | 1800 | a/monthly | Belgium, RVI Flanders R Intl | | | 9925eu | 13685eu | 13710va | | | |
| 1730 | 1800 | | Finland, Scandv Weekend Radio | | | 6170va | 11690va | | | | |
| 1730 | 1800 | | Guam, KSDA/ AWR | | | 7455as | 9385me | 11560me | | | |
| 1730 | 1800 | | Liberia, ELWA | | | 4760do | | | | | |
| 1730 | 1800 | | Netherlands, Radio | | | 6020af | 11655as | | | | |
| 1730 | 1800 | | Philippines, Radio Pilipinas | | | 11730me | 11890me | 15190me | | | |
| 1730 | 1800 | | S Africa, AWR Africa | | | 12130af | | | | | |
| 1730 | 1800 | | Switzerland, Swiss R Intl | | | 9605af | 13790va | 15555va | | | |
| 1730 | 1800 | | Vatican City, Vatican Radio | | | 13765af | 15570af | 17515af | | | |
| 1735 | 1745 | vl/th | Paraguay, Radio Nacional | | | 9739sa | | | | | |
| 1745 | 1800 | | Bangladesh, Bangla Betar | | | 7185eu | 9550eu | 15520eu | | | |
| 1745 | 1800 | | India, All India Radio | | | 7410eu | 11620eu | 11935va | 13605af | 15155af | |
| | | | 17670af | | | | | | | | |
| 1745 | 1800 | smtwhf | Swaziland, TWR | | | 3200af | | | | | |

1800 UTC - 2PM E / 1PM C / 11AM P

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|------|------|-----------|---------------------------------|--|---------|---------|----------|---------|---------|--|--|
| 1800 | 1810 | | Zambia, National BC Corp | | | 6265do | | | | | |
| 1800 | 1815 | | Bangladesh, Bangla Betar | | | 7185eu | 9550eu | 15520eu | | | |
| 1800 | 1827 | | Vietnam, Voice of | | 5955eu | | 7145eu | 9730eu | | | |
| 1800 | 1830 | | Azerbaijan, Voice of | | 6110eu | | 9155eu | | | | |
| 1800 | 1830 | | Egypt, Radio Cairo | | 15255af | | | | | | |
| 1800 | 1830 | | Germany, Deutsche Welle | | | 3995eu | | | | | |
| 1800 | 1830 | s | Germany, Universal Life | | 11840af | | | | | | |
| 1800 | 1830 | | S Africa, AWR Africa | | 5960af | | 6100af | | | | |
| 1800 | 1830 | | S Africa, Channel Africa | | 17870af | | | | | | |
| 1800 | 1830 | | UK, RTE Radio | | 9895me | | | | | | |
| 1800 | 1850 | mtwhf | New Zealand, Radio NZ Intl | | | 11980pa | | | | | |
| 1800 | 1857 | | Czech Rep. Radio Prague Intl | | | 5930eu | 7315va | | | | |
| 1800 | 1858 | | Yemen, Rep of Yemen Radio | | | 9780me | | | | | |
| 1800 | 1900 | | Anguilla, Caribbean Beacon | | | 11775am | | | | | |
| 1800 | 1900 | vl | Australia, ABC/Alice Springs | | | 2310do | | | | | |
| 1800 | 1900 | vl | Australia, ABC/Katherine | | | 2485do | | | | | |
| 1800 | 1900 | vl | Australia, ABC/Tennant Creek | | | 2325do | | | | | |
| 1800 | 1900 | | Australia, Christian Voice Intl | | | 7170pa | 9795pa | | | | |
| 1800 | 1900 | | Australia, Radio | | 6080as | 7240pa | 9430va | 9475as | 9580va | | |
| | | | 11880va | | | | | | | | |
| 1800 | 1900 | vl | Botswana, Radio | | 3356do | 4820do | | | | | |
| 1800 | 1900 | vl | Cameroon, RTV | | 4850do | 6005do | | | | | |
| 1800 | 1900 | | Canada, CBC Northern Service | | | 9625do | | | | | |
| 1800 | 1900 | | Canada, CFRX Toronto ON | | | 6070do | | | | | |
| 1800 | 1900 | | Canada, CFVP Calgary AB | | | 6030do | | | | | |
| 1800 | 1900 | | Canada, CHNX Halifax, NS | | | 6130do | | | | | |
| 1800 | 1900 | | Canada, CKZN St John's NF | | | 6160do | | | | | |
| 1800 | 1900 | | Canada, CKZU Vancouver BC | | | 6160do | | | | | |
| 1800 | 1900 | | Costa Rica, R for Peace Intl | | | 15040va | 21815usb | | | | |
| 1800 | 1900 | | Costa Rica, University Network | | | 5030am | 6150am | 7375am | 9724sa | | |
| | | | 11870am 13749na | | 17645as | | | | | | |
| 1800 | 1900 | mtwhf | Eqt Guinea, Radio Africa | | | 15185af | | | | | |
| 1800 | 1900 | a/monthly | Finland, Scandv Weekend Radio | | | 6170va | 11690va | | | | |
| 1800 | 1900 | | Germany, Unt. Methodist Church | | | 11735af | 13820af | | | | |
| 1800 | 1900 | | Germany, Voice of Hope | | | 9815eu | | | | | |
| 1800 | 1900 | | Germany, Voice of Hope | | | 9815eu | | | | | |
| 1800 | 1900 | vl | Ghana, Ghana BC Corp | | | 3366do | 4915do | | | | |
| 1800 | 1900 | | Guyana, Voice of | | 5950do | | | | | | |
| 1800 | 1900 | | India, All India Radio | | 7410as | 11620eu | 11935va | 13605af | 15155af | | |
| | | | 17670af | | | | | | | | |
| 1800 | 1900 | vl | Italy, IRRS | | 3980al | 3985va | | | | | |
| 1800 | 1900 | | Kenya, Kenya BC Corp | | 4885irr | 4915irr | | | | | |
| 1800 | 1900 | | Kuwait, Radio | | 11990va | | | | | | |
| 1800 | 1900 | vl | Lesotho, Radio | | 4800do | | | | | | |
| 1800 | 1900 | | Liberia, ELWA | | 4760do | | | | | | |
| 1800 | 1900 | | Liberia, R Liberia Intl | | 5100do | | | | | | |
| 1800 | 1900 | | Namibia, NBC | | 3270af | 3290af | 7215irr | | | | |
| 1800 | 1900 | | Netherlands, Radio | | 6020af | 11655af | | | | | |
| 1800 | 1900 | vl | Nigeria, Radio/Enugu | | 6025do | | | | | | |
| 1800 | 1900 | vl | Nigeria, Radio/Ibadan | | 6050do | | | | | | |
| 1800 | 1900 | vl | Nigeria, Radio/Kaduna | | 4770do | 6090do | 7275do | 9570do | | | |
| 1800 | 1900 | vl | Nigeria, Radio/Lagos | | 3326do | 4990do | | | | | |
| 1800 | 1900 | | Philippines, Radio Pilipinas | | | 11730me | 11890me | 15190me | | | |
| 1800 | 1900 | | Russia, University Network | | | 17765as | | | | | |
| 1800 | 1900 | | Russia, Voice of Russia | | 5940eu | 5950eu | 6175eu | 7335af | 7340eu | | |
| | | | 7360eu 7440eu | | 9775eu | 9875af | 11510af | | | | |
| 1800 | 1900 | | Russia, World Beacon | | 3230af | 9575eu | 17850af | | | | |
| 1800 | 1900 | | S Africa, African Beacon | | 3230af | | | | | | |
| 1800 | 1900 | | Sierra Leone, SLBS | | 3316do | | | | | | |
| 1800 | 1900 | | Swaziland, TWR | | 3200af | 9500af | | | | | |
| 1800 | 1900 | | Taiwan, R Taipei Intl | | 3955eu | | | | | | |

Shortwave Guide



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|------|------|----------------------------|---------|---------|----------|---------|---------|--|
| 1800 | 1900 | Uganda, Radio | 5026do | 7196do | | | | |
| 1800 | 1900 | UK, BBC World Service | 3255af | 5975as | 6190af | 6195eu | 9410eu | |
| | | 9510as 9740me | 15400af | 15420af | 17830af | 21470af | | |
| 1800 | 1900 | UK, World Beacon | 3230af | 9575eu | 17850af | | | |
| 1800 | 1900 | USA, Armed Forces Radio | | 6458usb | 12689usb | | | |
| 1800 | 1900 | USA, KAJI Dallas TX | 13815va | | | | | |
| 1800 | 1900 | USA, KTBN Salt Lk City UT | | 15590na | | | | |
| 1800 | 1900 | USA, KWHR Naalehu HI | 9930as | | | | | |
| 1800 | 1900 | USA, Voice of America | 6035af | 6040af | 9760as | 9840as | 11975af | |
| 1800 | 1900 | 13710af 15240af | 15580af | 17895af | | | | |
| 1800 | 1900 | USA, WBCQ Monticello ME | | 9335na | 17495na | | | |
| 1800 | 1900 | USA, WEWN Birmingham AL | | 11530na | 11550na | 13615na | 15745na | |
| | | 17595eu | | | | | | |
| 1800 | 1900 | USA, WHRA Greenbush ME | | 17650af | | | | |
| 1800 | 1900 | USA, WHRI Noblesville IN | | 9495am | 13760va | | | |
| 1800 | 1900 | USA, WINB Red Lion PA | 13570am | | | | | |
| 1800 | 1900 | USA, WJCR Upton KY | 7490am | 13595as | | | | |
| 1800 | 1900 | USA, WMLK Bethel PA | 15265eu | | | | | |
| 1800 | 1900 | USA, WRMI Miami FL | 15725na | | | | | |
| 1800 | 1900 | USA, WRNO New Orleans LA | | 7395am | 15420am | | | |
| 1800 | 1900 | USA, WSHB Cyp Creek SC | | 15665eu | 18910af | | | |
| 1800 | 1900 | USA, WTJC Newport NC | | 9370na | | | | |
| 1800 | 1900 | USA, WWCN Nashville TN | | 9475na | 12160na | 13845na | 15685na | |
| 1800 | 1900 | USA, WWRB Manchester TN | | 9320va | 12172va | | | |
| 1800 | 1900 | USA, WYFR Okeechobee FL | | 18980eu | | | | |
| 1800 | 1900 | Zambia, Christian Voice | 4965do | | | | | |
| 1800 | 1900 | Zimbabwe, Zimbabwe BC Corp | | 4828do | 6045do | | | |
| 1815 | 1900 | Bangladesh, Bangla Betar | | 7185eu | 9550eu | 15520eu | | |
| 1830 | 1900 | Georgia, Georgian Radio | | 6230eu | | | | |
| 1830 | 1900 | Georgia, Georgian Radio | | 6080as | | | | |
| 1830 | 1900 | Netherlands, Radio | 9895af | 17605af | | | | |
| 1830 | 1900 | Slovakia, R Slovakia Intl | 5915eu | 6055eu | 7345eu | | | |
| 1830 | 1900 | Sweden, Radio | 6065eu | | | | | |
| 1830 | 1900 | Sweden, Radio | 5840eu | | | | | |
| 1830 | 1900 | Turkey, Voice of | 7125eu | | | | | |
| 1830 | 1900 | UK, RTE Radio | 13640na | 21630af | | | | |
| 1830 | 1900 | USA, Voice of America | 13675af | 15160af | 17640af | | | |
| 1845 | 1900 | Albania, Radio Tirana Intl | | 7210eu | 9510eu | | | |
| 1845 | 1900 | Congo, RTV Congolaise | 4765af | 5985af | | | | |
| 1850 | 1900 | New Zealand, Radio NZ Intl | | 15160pa | | | | |

1900 UTC - 3PM E / 2PM C / 12PM P

| | | | | | | | | |
|------|------|---------------------------------|---------|---------|----------|---------|---------|--|
| 1900 | 1915 | Congo, RTV Congolaise | 4765do | 5985af | | | | |
| 1900 | 1920 | Turkey, Voice of | 7125eu | | | | | |
| 1900 | 1927 | Vietnam, Voice of | 7145eu | 9730eu | | | | |
| 1900 | 1930 | Hungary, Radio Budapest | | 6025eu | 7135eu | | | |
| 1900 | 1930 | Israel, Kol Israel | 6280va | 7520va | 9435va | 15640af | 15650va | |
| 1900 | 1930 | Philippines, Radio Pilipinas | | 11730me | 11890me | 15190me | | |
| 1900 | 1930 | USA, VOA Special English | | 9785me | 12015me | 13640me | | |
| 1900 | 1945 | Germany, Deutsche Welle | | 11765af | 11810af | 13780af | 15275af | |
| | | 15390af 17810af | | | | | | |
| 1900 | 1945 | Germany, Deutsche Welle | | 6180eu | | | | |
| 1900 | 1945 | India, All India Radio | 7410as | 11620eu | 11935va | 13605af | 15155af | |
| | | 17670af | | | | | | |
| 1900 | 1956 | China, China Radio Intl | 9440af | 9585af | 13790af | | | |
| 1900 | 1956 | North Korea, Voice of | 7505eu | 11334eu | | | | |
| 1900 | 2000 | Anguilla, Caribbean Beacon | | 11775am | | | | |
| 1900 | 2000 | Argentina, RAE | 9690eu | 15345eu | | | | |
| 1900 | 2000 | Australia, ABC/Katherine | | 2485do | | | | |
| 1900 | 2000 | Australia, ABC/Tennant Creek | | 2325do | | | | |
| 1900 | 2000 | Australia, Christian Voice Intl | | 7170pa | 9795pa | | | |
| 1900 | 2000 | Australia, Radio | 6080as | 7240pa | 9500as | 9580va | 11880va | |
| 1900 | 2000 | Botswana, Radio | 3356do | 4820do | | | | |
| 1900 | 2000 | Bulgaria, Radio | 5800eu | 7500eu | | | | |
| 1900 | 2000 | Cameroon, RTV | 4850do | 6005do | | | | |
| 1900 | 2000 | Canada, CBC Northern Service | | 9625do | | | | |
| 1900 | 2000 | Canada, CFRX Toronto ON | | 6070do | | | | |
| 1900 | 2000 | Canada, CFVP Calgary AB | | 6030do | | | | |
| 1900 | 2000 | Canada, CHNX Halifax, NS | | 6130do | | | | |
| 1900 | 2000 | Canada, CKZN St John's NF | | 6160do | | | | |
| 1900 | 2000 | Canada, CKZU Vancouver BC | | 6160do | | | | |
| 1900 | 2000 | Costa Rica, R for Peace Intl | | 15040va | 21815usb | | | |
| 1900 | 2000 | Costa Rica, University Network | | 5030am | 6150am | 7375am | 9724sa | |
| | | 11870am 13749na | 17645as | | | | | |
| 1900 | 2000 | Eq Guinea, Radio Africa | | 15185af | | | | |
| 1900 | 2000 | Finland, Scandv Weekend Radio | | 6170va | 11690va | | | |
| 1900 | 2000 | Ghana, Ghana BC Corp | | 3366do | 4915do | | | |
| 1900 | 2000 | Greece, Voice of | 5865eu | 7475eu | 17705na | | | |
| 1900 | 2000 | Guyana, Voice of | 5950do | | | | | |
| 1900 | 2000 | Italy, IRRS | 3980al | 3985va | | | | |
| 1900 | 2000 | Kenya, Kenya BC Corp | 4885irr | 4915irr | | | | |
| 1900 | 2000 | Kuwait, Radio | 11990va | | | | | |
| 1900 | 2000 | Lesotho, Radio | 4800do | | | | | |
| 1900 | 2000 | Liberia, ELWA | 4760do | | | | | |
| 1900 | 2000 | Liberia, R Liberia Intl | 5100do | | | | | |
| 1900 | 2000 | Malta, VO Mediterranean | | 7440eu | | | | |
| 1900 | 2000 | Namibia, NBC | 3270af | 7215irr | | | | |
| 1900 | 2000 | Netherlands, Radio | 6020af | 9895af | 11655af | 17605af | | |
| 1900 | 2000 | New Zealand, Radio NZ Intl | | 15160pa | | | | |
| 1900 | 2000 | Nigeria, Radio/Enugu | 6025do | | | | | |
| 1900 | 2000 | Nigeria, Radio/Ibadan | 6050do | | | | | |
| 1900 | 2000 | Nigeria, Radio/Kaduna | 4770do | 6090do | 7275do | 9570do | | |
| 1900 | 2000 | Nigeria, Radio/Lagos | 3326do | 4990do | | | | |
| 1900 | 2000 | Nigeria, Voice of | 7255af | 11770af | 15120va | | | |
| 1900 | 2000 | Russia, University Network | | 17765as | | | | |
| 1900 | 2000 | Russia, Voice of Russia | 5940eu | 5950eu | 6175eu | 7340eu | 7390eu | |
| | | 9775eu 15735eu | | | | | | |

| | | | | | | | | |
|------|------|-------------------------------|---------|---------|----------|---------|---------|--|
| 1900 | 2000 | Russia, World Beacon | 3230af | 17850af | | | | |
| 1900 | 2000 | S Africa, African Beacon | 3230af | | | | | |
| 1900 | 2000 | Sierra Leone, SLBS | 3316do | | | | | |
| 1900 | 2000 | Solomon Islands, SIBC | 5020do | | | | | |
| 1900 | 2000 | South Korea, R Korea Intl | | 5975om | 7275eu | | | |
| 1900 | 2000 | Swaziland, TWR | 3200af | | | | | |
| 1900 | 2000 | Thailand, Radio | 9535eu | 9655eu | 11905eu | | | |
| 1900 | 2000 | Uganda, Radio | 5026do | 7196do | | | | |
| 1900 | 2000 | UK, BBC World Service | 3255af | 6005af | 6190af | 6195eu | 9410eu | |
| | | 9630af 12095af | 15400af | 17830af | | | | |
| 1900 | 2000 | UK, World Beacon | 3230af | 17850af | | | | |
| 1900 | 2000 | USA, Armed Forces Radio | | 6458usb | 12689usb | | | |
| 1900 | 2000 | USA, KAJI Dallas TX | 13815va | | | | | |
| 1900 | 2000 | USA, KJES Vado NM | 15385au | | | | | |
| 1900 | 2000 | USA, KTBN Salt Lk City UT | | 15590na | | | | |
| 1900 | 2000 | USA, KWHR Naalehu HI | 9930as | | | | | |
| 1900 | 2000 | USA, Voice of America | 4950af | 6035af | 7415af | 9525pa | 9690as | |
| | | 9760as 11870pa | 11975af | 13710af | 15180pa | 15240af | 15580af | |
| | | 17895af 15580af | | | | | | |
| 1900 | 2000 | USA, Voice of America | 5965me | 9840as | 11720as | 11970as | 13725af | |
| | | 15205me 15410as | | | | | | |
| 1900 | 2000 | USA, WBCQ Monticello ME | | 9335na | 17495na | | | |
| 1900 | 2000 | USA, WEWN Birmingham AL | | 11550na | 11530na | 13615na | 15745na | |
| | | 17595eu | | | | | | |
| 1900 | 2000 | USA, WHRA Greenbush ME | | 17650af | | | | |
| 1900 | 2000 | USA, WHRI Noblesville IN | | 9495am | 13760va | | | |
| 1900 | 2000 | USA, WINB Red Lion PA | 13570am | | | | | |
| 1900 | 2000 | USA, WJCR Upton KY | 7490am | 13595as | | | | |
| 1900 | 2000 | USA, WMLK Bethel PA | 15265eu | | | | | |
| 1900 | 2000 | USA, WRMI Miami FL | 15725na | | | | | |
| 1900 | 2000 | USA, WRNO New Orleans LA | | 7395am | 15420am | | | |
| 1900 | 2000 | USA, WSHB Cyp Creek SC | | 15665eu | 18910af | | | |
| 1900 | 2000 | USA, WTJC Newport NC | | 9370na | | | | |
| 1900 | 2000 | USA, WWCN Nashville TN | | 9475na | 12160na | 13845na | 15685na | |
| 1900 | 2000 | USA, WWRB Manchester TN | | 9320va | 12172va | | | |
| 1900 | 2000 | USA, WYFR Okeechobee FL | | 13855af | 15565eu | 18980eu | | |
| 1900 | 2000 | Zambia, Christian Voice | 4965do | | | | | |
| 1900 | 2000 | Zimbabwe, Zimbabwe BC Corp | | 4828do | 6045do | | | |
| 1930 | 1955 | Belgium, RVI Flanders R Intl | | 9925eu | | | | |
| 1930 | 1955 | Greece, Voice of | 11645eu | | | | | |
| 1930 | 2000 | Austria, Radio Austria Intl | | 5945eu | 6155eu | | | |
| 1930 | 2000 | Belarus, Radio Belarus Intl | | 7105eu | 7210eu | | | |
| 1930 | 2000 | Georgia, Georgian Radio | | 11760eu | | | | |
| 1930 | 2000 | Greece, Voice of | 5865eu | 7475eu | 11645na | 17705na | | |
| 1930 | 2000 | Iran, VO Islamic Rep. of Iran | | 6110eu | 9890eu | 11695af | 15140af | |
| 1930 | 2000 | Papua New Guinea, NBC | | 4890do | | | | |
| 1930 | 2000 | Poland, Radio Polonia | 5995eu | 7165eu | 7290eu | 9540eu | | |
| 1930 | 2000 | Switzerland, Swiss R Intl | 9605af | 13660af | 15485af | 17660me | | |
| 1930 | 2000 | Yugoslavia, Radio | 6100eu | | | | | |
| 1935 | 1955 | Italy, RAI Intl | 5970eu | 9475eu | | | | |
| 1950 | 2000 | Vatican City, Vatican Radio | | 4005eu | 5885eu | 7250eu | 9645eu | |

2000 UTC - 4PM E / 3PM C / 1PM P

| | | | | | | | | |
|------|------|-----------------------------|--------|--------|---------|---------|--|--|
| 2000 | 2010 | Vatican City, Vatican Radio | 4005eu | 5885eu | 7250eu | | | |
| 2000 | 2015 | Swaziland, TWR | 3200af | | | | | |
| 2000 | 2025 | Netherlands, Radio | 6020af | 9895af | 11655af | 17605af | | |
| 2000 | 2029 | Poland, Radio Polonia | 5995eu | 7165eu | 7290eu | 9540eu | | |

Hauser's Highlights

LIBYA: [non] LJB/Radio Great Jamahiriya/Voice of Africa

Registered A-02 frequencies for LJB via Issoudun, France, 500 kW to Africa, with azimuths:

| | | |
|-----------|-------|-----|
| 1045-1230 | 17695 | 204 |
| 1045-1230 | 21630 | 185 |
| 1045-1230 | 21675 | 153 |
| 1045-1230 | 21695 | 140 |
| 1630-1800 | 17530 | 153 |
| 1630-1800 | 17635 | 140 |
| 1630-1900 | 17695 | 185 |
| 1630-2000 | 15625 | 204 |
| 1800-2000 | 15205 | 153 |
| 1800-2000 | 15660 | 140 |
| 1900-2100 | 15615 | 185 |
| 1800-2200 | 11715 | 140 |
| 2000-2200 | 9415 | 204 |
| 2000-2200 | 11635 | 153 |
| 2100-2200 | 9415 | 185 |
| 2100-2200 | 11645 | 185 |
| 2200-0400 | 7330 | 204 |
| 2200-0400 | 9445 | 140 |
| 2200-0400 | 9485 | 153 |

(Ivo and Angel, Observer, Bulgaria) A new relay! Many of same frequencies already reported testing in January, and assumed to have been direct from Libya, but actually already via France? (gh)

Shortwave Guide



| | | | | | | | |
|------|------|-----------|---------------------------------|----------|----------|----------|-----------------|
| 2000 | 2030 | | Iran, VO Islamic Rep. of Iran | 6110eu | 9890eu | 11695af | 15140af |
| 2000 | 2030 | mtwhf | Lithuania, Tomorrow's Nk Today | 7590eu | | | |
| 2000 | 2030 | | Mongolia, Voice of | 12015as | | | |
| 2000 | 2030 | | S Africa, AWR Africa | 17695af | | | |
| 2000 | 2030 | | Switzerland, Swiss R Intl | 9605af | 13660af | 15485af | 17660me |
| 2000 | 2030 | | USA, Voice of America | 4950af | 6035af | 6095af | 7415af 9690as |
| | | | 9760as 11855af 11975af | 13710af | 15240af | 15580af | 17885af |
| | | | 17895af | | | | |
| 2000 | 2030 | | Vatican City, Vatican Radio | 9660af | 11625af | 13765af | |
| 2000 | 2045 | | Iraq, Radio Iraq Intl | 7157irr | 9887irr | 11787irr | |
| 2000 | 2056 | | China, China Radio Intl | 5965eu | 9440af | 9840eu | 13640af 15125af |
| 2000 | 2100 | | Algeria, Radio Algiers Intl | 11715eu | 15160eu | 15160va | |
| 2000 | 2100 | | Anguilla, Caribbean Beacon | 11775am | | | |
| 2000 | 2100 | vi | Australia, ABC/Alice Springs | 2310do | | | |
| 2000 | 2100 | vi | Australia, ABC/Katherine | 2485do | | | |
| 2000 | 2100 | vi | Australia, ABC/Tennant Creek | 2325do | | | |
| 2000 | 2100 | | Australia, Christian Voice Intl | 7170pa | 9795pa | | |
| 2000 | 2100 | | Australia, Radio | 9500as | 9580va | 11880va | |
| 2000 | 2100 | vi | Botswana, Radio | 3356do | 4820do | | |
| 2000 | 2100 | vi | Cameroon, RTV | 4850do | 6005do | | |
| 2000 | 2100 | | Canada, CBC Northern Service | 9625do | 6070do | | |
| 2000 | 2100 | | Canada, CFRX Toronto ON | 6030do | 6130do | | |
| 2000 | 2100 | | Canada, CFPV Calgary AB | 6100do | 6160do | | |
| 2000 | 2100 | | Canada, CHNX Halifax, NS | 6160do | 6160do | | |
| 2000 | 2100 | | Canada, CKZN St John's NF | 6160do | 6160do | | |
| 2000 | 2100 | | Canada, CKZU Vancouver BC | 6160do | 6160do | | |
| 2000 | 2100 | | Costa Rica, R for Peace Intl | 15040va | 21815usb | | |
| 2000 | 2100 | | Costa Rica, University Network | 5030am | 6150am | 7375am | 9724sa |
| | | | 11870am 13749na 17645as | | | | |
| | | | 11890eu | | | | |
| 2000 | 2100 | | Ecuador, HCJB | 11890eu | | | |
| 2000 | 2100 | mtwhf | Eqt Guinea, Radio Africa | 15185af | | | |
| 2000 | 2100 | a/monthly | Finland, Scandv Weekend Radio | 6170va | 11690va | | |
| 2000 | 2100 | vi | Ghana, Ghana BC Corp | 3366do | 4915do | | |
| 2000 | 2100 | | Guyana, Voice of | 5950do | | | |
| 2000 | 2100 | | Indonesia, Voice of | 9525pa | 11785as | 15150as | |
| 2000 | 2100 | vi | Italy, IRRS | 3980al | 3985va | | |
| 2000 | 2100 | | Kenya, Kenya BC Corp | 4885irr | 4915irr | | |
| 2000 | 2100 | | Kuwait, Radio | 11990va | | | |
| 2000 | 2100 | vi | Lesotho, Radio | 4800do | | | |
| 2000 | 2100 | | Liberia, ELWA | 4760do | | | |
| 2000 | 2100 | | Liberia, R Liberia Intl | 5100do | | | |
| 2000 | 2100 | | Namibia, NBC | 3270af | 3290af | 7215irr | |
| 2000 | 2100 | | New Zealand, Radio NZ Intl | 15160pa | | | |
| 2000 | 2100 | vi | Nigeria, Radio/Enugu | 6025do | 6090do | 7275do | 9570do |
| 2000 | 2100 | vi | Nigeria, Radio/Ibadan | 6050do | 4990do | | |
| 2000 | 2100 | vi | Nigeria, Radio/Kaduna | 4770do | 4990do | | |
| 2000 | 2100 | vi | Nigeria, Radio/Lagos | 3326do | 11770af | 15120va | |
| 2000 | 2100 | | Nigeria, Voice of | 7255af | 4890do | | |
| 2000 | 2100 | vi | Papua New Guinea, NBC | 4890do | 17765as | | |
| 2000 | 2100 | | Russia, University Network | 5940eu | 5950eu | 6175eu | 7300eu 7340eu |
| 2000 | 2100 | | Russia, Voice of Russia | 5940eu | 5950eu | 6175eu | 7300eu 7340eu |
| | | | 7390eu 15735eu | | | | |
| 2000 | 2100 | | Russia, World Beacon | 3230af | 17850af | | |
| 2000 | 2100 | | S Africa, African Beacon | 3230af | 9630alt | 9680eu | |
| 2000 | 2100 | vi | Solomon Islands, SIBC | 5020do | 7196do | | |
| 2000 | 2100 | mtwhf | Spain, R Exterior Espana | 9595af | 6005af | 6190af | 6195eu 9410eu |
| 2000 | 2100 | | Uganda, Radio | 5026do | 15400af | 17830af | |
| 2000 | 2100 | | UK, BBC World Service | 3255af | 17850af | | |
| 2000 | 2100 | | UK, World Beacon | 3230af | 6458usb | 12689usb | |
| 2000 | 2100 | | USA, Armed Forces Radio | | | | |
| 2000 | 2100 | | USA, KAIJ Dallas TX | 13815va | | | |
| 2000 | 2100 | | USA, KJES Vado NM | 15385na | | | |
| 2000 | 2100 | | USA, KTBN Salt Lk City UT | | 15590na | | |
| 2000 | 2100 | | USA, KWHR Naalehu HI | 9930as | | | |
| 2000 | 2100 | | USA, WBCQ Monticello ME | 9335na | 17495na | | |
| 2000 | 2100 | | USA, WEWN Birmingham AL | 11530na | 13615na | 15745na | 17595eu |
| 2000 | 2100 | | USA, WHRA Greenbush ME | 17650af | | | |
| 2000 | 2100 | | USA, WHRI Noblesville IN | 5745va | 9495am | | |
| 2000 | 2100 | | USA, WINB Red Lion PA | 13570am | | | |
| 2000 | 2100 | | USA, WJCR Upton KY | 7490am | 13595as | | |
| 2000 | 2100 | | USA, WMLK Bethel PA | 15265eu | | | |
| 2000 | 2100 | mtwhf | USA, WRMI Miami FL | 15725na | | | |
| 2000 | 2100 | | USA, WRNO New Orleans LA | | 7395am | 15420am | |
| 2000 | 2100 | | USA, WTJC Newport NC | | 9370na | | |
| 2000 | 2100 | | USA, WWRB Nashville TN | | 9475na | 12160na | 13845na 15685na |
| 2000 | 2100 | | USA, WWRB Manchester TN | | 9320va | 12172va | |
| 2000 | 2100 | | USA, WYFR Okeechobee FL | | 7580eu | 13820af | 13855af 15565af |
| | | | 17575sa | | | | |
| 2000 | 2100 | vi | Vanuatu, Radio | 3945do | 4960do | 7260do | |
| 2000 | 2100 | | Zambia, Christian Voice | 4965do | | | |
| 2000 | 2100 | vi | Zimbabwe, Zimbabwe BC Corp | | 4828do | 6045do | |
| 2000 | 2100 | | USA, WSHB Cyp Creek SC | | 11550eu | 15665af | |
| 2005 | 2100 | vi | Syria, Radio Damascus | 12085eu | 13610eu | | |
| 2025 | 2045 | | Italy, RAI Intl | 7220af | 9710af | 11880af | |
| 2030 | 2045 | vi | Libya, Voice of Africa | 15435irr | 17750irr | | |
| 2030 | 2045 | | Thailand, Radio | 9535eu | 9655eu | 11905eu | |
| 2030 | 2057 | | Vietnam, Voice of | 7145eu | 9730eu | | |
| 2030 | 2100 | | Austria, Christian Voice | 7170pa | 11935pa | | |
| 2030 | 2100 | th | Belarus, Radio Belarus Intl | 7105eu | 7210eu | | |
| 2030 | 2100 | | Cuba, Radio Havana | 13660usb | 13750eu | | |
| 2030 | 2100 | | Egypt, Radio Cairo | 15375af | | | |
| 2030 | 2100 | | S Africa, AWR Africa | 15295af | | | |
| 2030 | 2100 | | Sweden, Radio | 6065eu | 9445au | | |
| 2030 | 2100 | | Turkey, Voice of | 9525as | | | |
| 2030 | 2100 | | USA, Voice of America | 6035af | 6095as | 7415af | 9690as 9760as |
| | | | 11975af 13710af 15240af | 15880af | 17885af | 17895af | |
| 2030 | 2100 | as | USA, Voice of America | 4950af | 5025eu | 7105eu | 11905eu |
| 2030 | 2100 | | Uzbekistan, Radio Tashkent | | | | |
| 2030 | 2130 | | Australia, Christian Voice Intl | | 11935pa | | |

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|----------------------------------|------|-----------|---------------------------------|----------|---------|----------|-------------------------|
| 2040 | 2100 | mtwhfa | Armenia, Voice of | 4810eu | 9960eu | | |
| 2045 | 2100 | | India, All India Radio | 7150va | 7410eu | 9650au | 9910au 11620eu |
| | | | 11715au | | | | |
| 2100 UTC - 5PM E / 4PM C / 2PM P | | | | | | | |
| 2100 | 2110 | | Kenya, Kenya BC Corp | 4885irr | 4915irr | | |
| 2100 | 2130 | vi | Australia, ABC/Alice Springs | | 2310do | | |
| 2100 | 2130 | vi | Australia, ABC/Katherine | | 2485do | | |
| 2100 | 2130 | vi | Australia, ABC/Tennant Creek | | 2325do | | |
| 2100 | 2130 | | Australia, Christian Voice Intl | | 11935pa | | |
| 2100 | 2130 | | Australia, Radio | 7240pa | 9500as | 9580va | 9660pa 11880va |
| | | | 12080pa 17715va 21740va | | | | |
| 2100 | 2130 | | Austria, Christian Voice | 7170pa | 11935pa | | |
| 2100 | 2130 | | China, China Radio Intl | 5965eu | 9840eu | 9845eu | 13640af 15125af |
| 2100 | 2130 | | Cuba, Radio Havana | 13660usb | 13750eu | | |
| 2100 | 2130 | | Mexico, Radio Mexico Intl | | 9705am | 11770am | |
| 2100 | 2130 | | Turkey, Voice of | 9525as | | | |
| 2100 | 2145 | | Germany, Deutsche Welle | | 9615af | 9690af | 9765as 15275pa |
| | | | 15410af 17560pa 17835af | | | | |
| 2100 | 2145 | | USA, WYFR Okeechobee FL | | 7580eu | 13820af | 15565af 17575sa |
| | | | 21525af | | | | |
| 2100 | 2156 | | North Korea, Voice of | 7505eu | 11335eu | | |
| 2100 | 2157 | | Czech Rep, Radio Prague Intl | | 5930va | 9430va | |
| 2100 | 2159 | | Canada, Radio Canada Intl | | 7235va | 7425va | 9770va 9805va |
| | | | 11600va 12015va 13650va | | | | |
| 2100 | 2200 | | Anguilla, Caribbean Beacon | | 11775am | | |
| 2100 | 2200 | | Australia, Christian Voice Intl | | 7170pa | | |
| 2100 | 2200 | | Austria, AWR Europe | 9660af | | | |
| 2100 | 2200 | vi | Botswana, Radio | 3356do | 4820do | | |
| 2100 | 2200 | | Bulgaria, Radio | 5800eu | 7500eu | | |
| 2100 | 2200 | vi | Cameroon, RTV | 4850do | 6005do | | |
| 2100 | 2200 | | Canada, CBC Northern Service | | 9625do | | |
| 2100 | 2200 | | Canada, CFRX Toronto ON | | 6070do | | |
| 2100 | 2200 | | Canada, CFPV Calgary AB | | 6030do | | |
| 2100 | 2200 | | Canada, CHNX Halifax, NS | | 6130do | | |
| 2100 | 2200 | | Canada, CKZN St John's NF | | 6160do | | |
| 2100 | 2200 | | Canada, CKZU Vancouver BC | | 6160do | | |
| 2100 | 2200 | | Costa Rica, R for Peace Intl | | 15040va | 21815usb | |
| 2100 | 2200 | | Costa Rica, University Network | | 5030am | 6150am | 7375am 9724sa |
| | | | 11870am 13749na 17645as | | | | |
| | | | 11890eu | | | | |
| 2100 | 2200 | | Ecuador, HCJB | | 11890eu | | |
| 2100 | 2200 | mtwhf | Egypt, Radio Cairo | | 15375af | | |
| 2100 | 2200 | f/monthly | Eqt Guinea, Radio Africa | | 15185af | | |
| 2100 | 2200 | vi | Finland, Scandv Weekend Radio | | 6170va | 11720va | |
| 2100 | 2200 | | Ghana, Ghana BC Corp | | 3366do | 4915do | |
| 2100 | 2200 | | Guyana, Voice of | | 5950do | | |
| 2100 | 2200 | | India, All India Radio | | 7150va | 7410eu | 9650au 9910au 11620eu |
| | | | 11715au | | | | |
| 2100 | 2200 | vi | Italy, IRRS | 3980al | 3985va | | |
| 2100 | 2200 | | Japan, Radio | 6115eu | 6180eu | 11850as | 11855af 11920as 17825pa |
| | | | 21670pa | | | | |
| 2100 | 2200 | vi | Lesotho, Radio | | 4800do | | |
| 2100 | 2200 | | Liberia, ELWA | | 4760do | | |
| 2100 | 2200 | | Liberia, R Liberia Intl | | 5100do | | |
| 2100 | 2200 | | Namibia, NBC | | 3270af | 3290af | 7215irr |
| 2100 | 2200 | | New Zealand, Radio NZ Intl | | 17675pa | | |
| 2100 | 2200 | vi | Nigeria, Radio/Enugu | | 6025do | 6090do | 7275do 9570do |
| 2100 | 2200 | vi | Nigeria, Radio/Ibadan | | 6050do | | |
| 2100 | 2200 | vi | Nigeria, Radio/Kaduna | | 4770do | | |
| 2100 | 2200 | vi | Nigeria, Radio/Lagos | | 3326do | | |
| 2100 | 2200 | | Nigeria, Voice of | | 7255af | 11770af | 15120va |
| 2100 | 2200 | vi | Papua New Guinea, NBC | | 4890do | | |
| 2100 | 2200 | | Romania, R Romania Intl | | 5955eu | 7105eu | 7215eu 9690eu |
| 2100 | 2200 | | Russia, University Network | | 17765as | | |
| 2100 | 2200 | | Russia, World Beacon | | 3230af | 17850af | |
| 2100 | 2200 | | S Africa, African Beacon | | 3230af | | |
| 2100 | 2200 | vi | Solomon Islands, SIBC | | 5020do | 9545do | |
| 2100 | 2200 | | South Korea, R Korea Intl | | | 15575eu | |
| 2100 | 2200 | vi | Syria, Radio Damascus | | 12085eu | 13610eu | |
| 2100 | 2200 | | UK, BBC World Service | | 3255af | 3915as | 5965as 6005af 6110as |
| | | | 6190af 6195va 9410eu | | | 11835af | 12095sa 15400af |
| 2100 | 2200 | | UK, World Beacon | | 3230af | 17850af | |
| 2100 | 2200 | | Ukraine, R Ukraine Intl | | 5905eu | 7240eu | 9560eu |
| 2100 | 2200 | | USA, Armed Forces Radio | | | 6458usb | 12689usb |
| 2100 | 2200 | | USA, KAIJ Dallas TX | | 13815va | | |
| 2100 | 2200 | | USA, KTBN Salt Lk City UT | | | 15590na | |
| 2100 | 2200 | | USA, KWHR Naalehu HI | | 9930as | | |
| 2100 | 2200 | | USA, Voice of America | | 6035af | 6040me | 6095as 6160as 7140me |
| | | | 7415af 9530me 9595as | | | 9670as | 9760me 11870pa 11975af |
| | | | 13710af 15185pa 15240af | | | 15580af | 17735as 17820as 17895af |
| | | | USA, WBCQ Monticello ME | | | 7415na | 9335na 17495na |
| 2100 | 2200 | | USA, WEWN Birmingham AL | | 11530na | 13615na | 15745na 17595eu |
| 2100 | 2200 | | USA, WHRA Greenbush ME | | 17650af | | |
| 2100 | 2200 | | USA, WHRI Noblesville IN | | 5745va | 9495am | |
| 2100 | 2200 | | USA, WINB Red Lion PA | | 13570am | | |
| 2100 | 2200 | | USA, WJCR Upton KY | | 7490am | 13595as | |
| 2100 | 2200 | smtwhf | USA, WRMI Miami FL | | 15725na | | |
| 2100 | 2200 | | USA, WRNO New Orleans LA | | | 7395am | 15420am |
| 2100 | 2200 | | USA, WSHB Cyp Creek SC | | | 11550eu | 15665af |
| 2100 | 2200 | | USA, WTJC Newport NC | | | 9370na | |
| 2100 | 2200 | | USA, WWCN Nashville TN | | | 9475na | 12160na 13845na 15685na |
| 2100 | 2200 | | USA, WWRB Manchester TN | | | 9320va | 12172va |
| 2100 | 2200 | vi | Vanuatu, Radio | | 3945do | 4960do | 7260do |
| 2100 | 2200 | | Zambia, Christian Voice | 4965do | | | |
| 2100 | 2200 | vi | Zimbabwe, Zimbabwe BC Corp | | 4828do | 6045do | |
| 2115 | 2130 | mtwhf | UK, BBC Caribbean Report | | 5975am | 11675am | 15190am |
| 2115 | 2130 | as | UK, BBC World Service | 5975am | | | |

Shortwave Guide



| | | | | | | | |
|------|------|-------------------------------|---------|---------|---------|---------|---------|
| 2115 | 2200 | Egypt, Radio Cairo | 9990eu | | | | |
| 2130 | 2145 | UK, BBC Calling Falklands | 11680sa | | | | |
| 2130 | 2155 | Belgium, RVI Flanders R Intl | 13700na | | | | |
| 2130 | 2156 | China, China Radio Intl | 5965eu | | | | |
| 2130 | 2200 | Australia, ABC/Alice Springs | 4835do | | | | |
| 2130 | 2200 | Australia, ABC/Katherine | 5025do | | | | |
| 2130 | 2200 | Australia, ABC/Tennant Creek | 4910do | | | | |
| 2130 | 2200 | Australia, Radio | 7240pa | 9660pa | 11880va | 12080pa | 17715va |
| | | | 21740va | | | | |
| 2130 | 2200 | Austria, Christian Voice | 7170as | | | | |
| 2130 | 2200 | Guam, KSDA/ AWR | 11960as | 11980as | | | |
| 2130 | 2200 | Hungary, Radio Budapest | 3975eu | 7135eu | | | |
| 2130 | 2200 | Iran, VO Islamic Rep. of Iran | 9780au | 11740au | | | |
| 2130 | 2200 | UK, Wales Radio Intl | 6010eu | | | | |
| 2130 | 2200 | Uzbekistan, Radio Tashkent | 5025eu | 7105eu | 11905eu | | |
| 2145 | 2200 | USA, WYFR Okeechobee FL | 7580eu | 15565af | | | |

2200 UTC - 6PM E / 5PM C / 3PM P

| | | | | | | | |
|------|------|---------------------------------|---------|----------|---------|---------|---------|
| 2200 | 2205 | Syria, Radio Damascus | 12085eu | 13610eu | | | |
| 2200 | 2230 | Canada, Radio Canada Intl | 6045va | 9770va | 9805va | 11600va | |
| 2200 | 2230 | India, All India Radio | 7150va | 9650au | 9910au | 11620eu | |
| | | | 11715au | | | | |
| 2200 | 2230 | Iran, VO Islamic Rep. of Iran | 9780au | 11740au | | | |
| 2200 | 2230 | Mexico, Radio Mexico Intl | 9705am | 11770am | | | |
| 2200 | 2230 | Papua New Guinea, NBC | 4890do | | | | |
| 2200 | 2230 | South Korea, R Korea Intl | 3955eu | | | | |
| 2200 | 2230 | USA, KWHR Naalehu HI | 9930as | | | | |
| 2200 | 2230 | USA, Voice of America | 6035af | 7415af | 11655af | 11975af | 13710af |
| 2200 | 2230 | Yugoslavia, Radio | 6100eu | | | | |
| 2200 | 2245 | Egypt, Radio Cairo | 9990eu | | | | |
| 2200 | 2245 | USA, WYFR Okeechobee FL | 7580eu | 11740na | 15565af | | |
| 2200 | 2250 | Turkey, Voice of | 9655na | 9830va | | | |
| 2200 | 2256 | China, China Radio Intl | 7170eu | | | | |
| 2200 | 2259 | Spain, R Exterior Espana | 9595va | 9680eu | | | |
| 2200 | 2300 | Anguilla, Caribbean Beacon | 6090am | | | | |
| 2200 | 2300 | Australia, ABC/Alice Springs | 4835do | | | | |
| 2200 | 2300 | Australia, ABC/Katherine | 5025do | | | | |
| 2200 | 2300 | Australia, ABC/Tennant Creek | 4910do | | | | |
| 2200 | 2300 | Australia, Christian Voice Intl | 13620pa | 17850pa | | | |
| 2200 | 2300 | Australia, Radio | 13620va | 15240as | 17715va | 17795va | 21740va |
| 2200 | 2300 | Austria, Christian Voice | 13620as | 17850as | | | |
| 2200 | 2300 | Cameroon, RTV | 4850do | 6005do | | | |
| 2200 | 2300 | Canada, CBC Northern Service | 9625do | 6070do | | | |
| 2200 | 2300 | Canada, CFRX Toronto ON | 6030do | 6130do | | | |
| 2200 | 2300 | Canada, CFVP Calgary AB | 6030do | 6130do | | | |
| 2200 | 2300 | Canada, CHNX Halifax, NS | 6160do | 6160do | | | |
| 2200 | 2300 | Canada, CKZN St John's NF | 6160do | | | | |
| 2200 | 2300 | Canada, CKZU Vancouver BC | 15040va | 21815usb | | | |
| 2200 | 2300 | Costa Rica, R for Peace Intl | 5030am | 6150am | 7375am | 9724sa | |
| | | Costa Rica, University Network | 11870am | 13749na | 17645as | | |
| 2200 | 2300 | Eat Guinea, Radio Africa | 15185af | 6170va | 11720va | | |
| 2200 | 2300 | Finland, Scandv Weekend Radio | 3366do | 4915do | | | |
| 2200 | 2300 | Ghana, Ghana BC Corp | 3290do | | | | |
| 2200 | 2300 | Guyana, Voice of | 3290do | | | | |
| 2200 | 2300 | Italy, IRRS | 3980al | 3985va | | | |
| 2200 | 2300 | Malaysia, Radio | 7295do | | | | |
| 2200 | 2300 | Namibia, NBC | 3270af | 3290af | 7215irr | | |
| 2200 | 2300 | New Zealand, Radio NZ Intl | 17675pa | | | | |
| 2200 | 2300 | Nigeria, Radio/Enugu | 6025do | | | | |
| 2200 | 2300 | Nigeria, Radio/Ibadan | 6050do | | | | |
| 2200 | 2300 | Nigeria, Radio/Kaduna | 4770do | 6090do | 7275do | 9570do | |
| 2200 | 2300 | Nigeria, Radio/Lagos | 3326do | 4990do | | | |
| 2200 | 2300 | Nigeria, Voice of | 7255af | 15120va | | | |
| 2200 | 2300 | Russia, University Network | 17765as | | | | |
| 2200 | 2300 | Solomon Islands, SIBC | 5020do | 9545do | | | |
| 2200 | 2300 | Taiwan, R Taipei Intl | 5810eu | 9335eu | | | |
| 2200 | 2300 | UK, BBC World Service | 5965as | 5975am | 6195va | 7105as | 9660as |
| | | 11685as | 11835af | 12080pa | 15400af | | |
| 2200 | 2300 | USA, Armed Forces Radio | 6458usb | 12689usb | | | |
| 2200 | 2300 | USA, KAIJ Dallas TX | 13815va | | | | |
| 2200 | 2300 | USA, KTBN Salt Lk City UT | 15590na | | | | |
| 2200 | 2300 | USA, Voice of America | 6160as | 7290me | 9530me | 9770as | |
| | | 9880as | 9890as | 11760as | 15185as | 15290as | 15305as |
| | | 17820as | | | | | |
| 2200 | 2300 | USA, WBCQ Monticello ME | 7415na | 9335na | 17495na | | |
| 2200 | 2300 | USA, WEWN Birmingham AL | 9975eu | 11530na | 15745na | 17595eu | |
| 2200 | 2300 | USA, WHRA Greenbush ME | 7650af | | | | |
| 2200 | 2300 | USA, WHRI Noblesville IN | 5745va | 9495am | | | |
| 2200 | 2300 | USA, WINB Red Lion PA | 13570am | | | | |
| 2200 | 2300 | USA, WJCR Upton KY | 7490am | 13595as | | | |
| 2200 | 2300 | USA, WRMI Miami FL | 15725na | | | | |
| 2200 | 2300 | USA, WRNO New Orleans LA | 7395am | | | | |
| 2200 | 2300 | USA, WSHB Cyp Creek SC | 7510eu | 15285sa | | | |
| 2200 | 2300 | USA, WTJC Newport NC | 9370na | | | | |
| 2200 | 2300 | USA, WWCR Nashville TN | 3215na | 7520na | 12160na | 13845na | |
| 2200 | 2300 | USA, WWWR Manchester TN | 9320va | 12172va | | | |
| 2200 | 2300 | Vanuatu, Radio | 3945do | 4960do | | | |
| 2200 | 2300 | Zambia, Christian Voice | 4965do | | | | |
| 2200 | 2359 | Liberia, R Liberia Intl | 5100do | | | | |
| 2205 | 2230 | Italy, RAI Intl | 9675as | 11900as | | | |
| 2230 | 2257 | Czech Rep, Radio Prague Intl | 7345na | 9435af | | | |
| 2230 | 2259 | Lithuania, R Vilnius | 9875na | | | | |
| 2230 | 2300 | Albania, Radio Tirana Intl | 7130eu | 9540eu | | | |
| 2230 | 2300 | Austria, Radio Austria Intl | 5945eu | 6155eu | | | |
| 2230 | 2300 | Cuba, Radio Havana | 9550am | | | | |
| 2230 | 2300 | Papua New Guinea, NBC | 4890do | 11880irr | | | |

| | | | | | | |
|------|------|-------------------------|--------|---------|---------|--|
| 2230 | 2300 | Sweden, Radio | 6065eu | 9435eu | | |
| 2245 | 2300 | India, All India Radio | 9705as | 9950as | 13605as | |
| 2245 | 2300 | USA, WYFR Okeechobee FL | | 11740na | | |

2300 UTC - 7PM E / 6PM C / 4PM P

| | | | | | | | |
|------|------|---------------------------------|----------|----------|---------|---------|---------|
| 2300 | 0000 | Anguilla, Caribbean Beacon | 6090am | | | | |
| 2300 | 0000 | Australia, ABC/Alice Springs | 4835do | | | | |
| 2300 | 0000 | Australia, ABC/Katherine | 5025do | | | | |
| 2300 | 0000 | Australia, ABC/Tennant Creek | 4910do | | | | |
| 2300 | 0000 | Australia, Radio | 9660pa | 12080pa | 13620va | 15240as | 17715va |
| | | 17795va | 21740va | | | | |
| 2300 | 0000 | Bulgaria, Radio | 7400na | 9400na | | | |
| 2300 | 0000 | Cameroon, RTV | 4850do | 6005do | | | |
| 2300 | 0000 | Canada, CBC Northern Service | 9625do | | | | |
| 2300 | 0000 | Canada, CFRX Toronto ON | 6070do | | | | |
| 2300 | 0000 | Canada, CFVP Calgary AB | 6030do | | | | |
| 2300 | 0000 | Canada, CHNX Halifax, NS | 6130do | | | | |
| 2300 | 0000 | Canada, CKZN St John's NF | 6160do | | | | |
| 2300 | 0000 | Canada, CKZU Vancouver BC | 6160do | | | | |
| 2300 | 0000 | Costa Rica, R for Peace Intl | 15040va | 21815usb | | | |
| 2300 | 0000 | Costa Rica, University Network | 5030am | 6150am | 7375am | 9925sa | |
| | | 11870am | 13749na | 17645as | | | |
| 2300 | 0000 | Ecuador, HCJB | 12035as | | | | |
| 2300 | 0000 | Egypt, Radio Cairo | 9900na | | | | |
| 2300 | 0000 | f/monthly | | | | | |
| 2300 | 0000 | Finland, Scandv Weekend Radio | 6170va | 11690va | | | |
| 2300 | 0000 | Ghana, Ghana BC Corp | 3366do | 4915do | | | |
| 2300 | 0000 | Guyana, Voice of | 3290do | 5950do | | | |
| 2300 | 0000 | India, All India Radio | 9705as | 9950as | 13605as | | |
| 2300 | 0000 | Italy, IRRS | 7120va | 7125al | | | |
| 2300 | 0000 | Liberia, R Liberia Intl | 5100do | | | | |
| 2300 | 0000 | Lithuania, R Vilnius | 7325am | | | | |
| 2300 | 0000 | Malaysia, Radio | 7295do | | | | |
| 2300 | 0000 | Malaysia, RTM Kota Kinabalu | 5980do | | | | |
| 2300 | 0000 | Namibia, NBC | 3270af | 3290af | 7215irr | | |
| 2300 | 0000 | New Zealand, Radio NZ Intl | 17675pa | | | | |
| 2300 | 0000 | Papua New Guinea, NBC | 4890do | 11880irr | | | |
| 2300 | 0000 | Romania, R Romania Intl | 7195eu | 9510na | 9570eu | 11940na | |
| 2300 | 0000 | Russia, University Network | 17765as | | | | |
| 2300 | 0000 | Singapore, SBC Radio One | 6150do | | | | |
| 2300 | 0000 | Solomon Islands, SIBC | 5020do | 9545do | | | |
| 2300 | 0000 | UK, BBC World Service | 3915as | 5875eu | 5965as | 5975am | 6035as |
| 2300 | 0000 | 7105as | 11685as | 11945as | 12095sa | 15280as | |
| 2300 | 0000 | USA, Armed Forces Radio | 6458usb | 12689usb | | | |
| 2300 | 0000 | USA, KAIJ Dallas TX | 13815va | | | | |
| 2300 | 0000 | USA, KTBN Salt Lk City UT | 15590na | | | | |
| 2300 | 0000 | USA, Voice of America | 6160as | 7215as | 7290me | 9530me | 9770me |
| | | 9880as | 9890as | 11760as | 15185as | 15290as | 15305as |
| | | 17820as | | | | | |
| 2300 | 0000 | USA, WBCQ Monticello ME | 7415na | 9335na | 17495na | | |
| 2300 | 0000 | USA, WEWN Birmingham AL | 9355na | 9975eu | 11530na | 17595eu | |
| 2300 | 0000 | USA, WHRA Greenbush ME | 7580eu | | | | |
| 2300 | 0000 | USA, WHRI Noblesville IN | 5745va | 9495am | | | |
| 2300 | 0000 | USA, WINB Red Lion PA | 12160am | | | | |
| 2300 | 0000 | USA, WJCR Upton KY | 7490am | 13595as | | | |
| 2300 | 0000 | USA, WRMI Miami FL | 15725na | | | | |
| 2300 | 0000 | USA, WRNO New Orleans LA | 7355am | | | | |
| 2300 | 0000 | USA, WSHB Cyp Creek SC | 7510va | 15285sa | | | |
| 2300 | 0000 | USA, WTJC Newport NC | 9370na | | | | |
| 2300 | 0000 | USA, WWBS Macon GA | 11900na | | | | |
| 2300 | 0000 | USA, WWCR Nashville TN | 3215na | 5070na | 7520na | 13845na | |
| 2300 | 0000 | USA, WWWR Manchester TN | 5085va | 6890va | | | |
| 2300 | 0000 | Vanuatu, Radio | 3945do | 4960do | | | |
| 2300 | 0000 | Zambia, Christian Voice | 4965do | | | | |
| 2300 | 2305 | Nigeria, Radio/Enugu | 6025do | | | | |
| 2300 | 2305 | Nigeria, Radio/Ibadan | 6050do | | | | |
| 2300 | 2305 | Nigeria, Radio/Kaduna | 4770do | 6090do | 7275do | 9570do | |
| 2300 | 2305 | Nigeria, Radio/Lagos | 3326do | 4990do | | | |
| 2300 | 2330 | Austria, Christian Voice | 13620as | 17850as | | | |
| 2300 | 2330 | Canada, Radio Canada Intl | 9560am | 6040am | 6175am | 9590am | |
| | | 9755am | 11865am | 13730am | | | |
| 2300 | 2330 | Cuba, Radio Havana | 9550am | | | | |
| 2300 | 2330 | USA, VOA Special English | 15395as | 6045as | 7140as | 9545as | 11925as |
| 2300 | 2345 | Germany, Deutsche Welle | 9470as | 9815as | 13690as | 21790as | |
| 2300 | 2345 | USA, WYFR Okeechobee FL | 11740na | 15170sa | 15400sa | | |
| 2300 | 2356 | China, China Radio Intl | 5990na | 13680na | | | |
| 2300 | 0000 | Australia, Christian Voice Intl | 11935pa | 13620pa | 17850pa | | |
| 2300 | 0000 | Austria, Christian Voice | 11935pa | 13620as | 17850as | | |
| 2300 | 0000 | Canada, Radio Canada Intl | 5960na | 6175na | 9590na | 9755na | |
| 2300 | 0000 | Malaysia, RTM Sarawak | 7160do | | | | |
| 2300 | 0000 | Netherlands, Radio | 6165na | 9845na | | | |
| 2300 | 0000 | USA, VOA Special English | 9620as | 11805as | 11925as | | |
| | | 13745as | | | | | |
| 2330 | 2345 | Libya, Voice of Africa | 15435irr | 17750irr | | | |
| 2330 | 2357 | Czech Rep, Radio Prague Intl | 7345na | 9435na | | | |
| 2330 | 2357 | Vietnam, Voice of | 9840as | 12020as | | | |
| 2330 | 2359 | Switzerland, Swiss R Intl | 9885sa | 11660sa | | | |

Visit

www.monitoringtimes.com

**Notes:**

1. Most Northern Hemisphere locations using summer or daylight savings time advance local clocks by one hour on April 7. Southern Hemisphere localities also will have reverted to standard time by this date. These local clock changes are taken into consideration by some stations in the setting of their schedules. This listing was prepared in late February before stations published their schedules for the new season. It is drawn from past experience. Therefore, there may be errors that could not have been anticipated.
2. **BBCWS stream abbreviations:** (am)=Americas; (eu)=Europe/N. Africa; (me)=Middle East, SW Asia, CIS (former Soviet Union); (wcaf)=West and Central Africa; (esaf)=East and Southern Africa; (af)=both (wcaf) and (esaf); (sas)=South Asia; (eas)=East Asia.
3. Listings for the U.S. based independent shortwave stations include only those programs that depart from their primary formats of political and religious fare.
4. An even more comprehensive schedule of programs broadcast globally on shortwave is available from my *WWW Shortwave Listening Guide* web site, hosted by NASWA and located at <http://www.anarc.org/naswa/swlguide>.

0000 UTC/ 8pm E/5pm P - Page 43 Freqs

BBC WORLD SERVICE (am)

0000 S/M World Briefing, T-A News; 0005 T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Music, F Meridian-Writing, A Omnibus (documentary); 0020 S/M Sports Roundup; 0030 S Arts in Action, M The World Today, T Music Mix, W UK Top 20, H/A Westway (drama serial), F World of Music; 0045 H UK Album Chart, A Music X-Press.

RADIO AUSTRALIA

0000 D News; 0005 S The Europeans, A Feedback (letters/station news); 0010 M AWAYE! (Aboriginal culture), T The Science Show, W The National Interest (Australian politics), H Background Briefing (documentary), F Hindsight (Australian history); 0030 A Country Breakfast (rural life); 0034 S Ockham's Razor (a science issue).

RADIO NETHERLANDS

0000 S/W Music 52-15 (international music), M Dutch Horizons, T Research File (science), H Documentary, F The Sound Fountain ("a torrent of ideas"), A A Good Life (global development); 0030 S Roughly Speaking (youth culture), M The Sound Fountain, T EuroQuest (Europe in context), W A Good Life, H Dutch Horizons, F Research File, A Documentary.

RADIO JAPAN

0000 D News; 0010 S Hello from Tokyo (listener contact), M Weekend Square; 0015 T-A 44 Minutes (feature magazine).

RADIO NEW ZEALAND INTERNATIONAL

0000 S/A News; M-F Midday Report; 0012 S This Week in Parliament, A Focus on Politics; 0033 S Spectrum (life in NZ), A The Sampler (latest CDs).

RADIO FOR PEACE INT'L, COSTA RICA

0000 S World of Radio, M Spiritual Awakening, T-A Freespeech Radio News; 0030 S RFPI Mailbag, M One World—One Family (Bahai program), T/H/A Hightower Radio (commentary), W Radio Nation ("The Nation"), F This Way Out (gays magazine); 0035 T/H/A Earthwatch (ecology); 0040 T/H/A Earth & Sky (astronomy); 0045 T Tropical Conservation Newsbureau (rainforests), H World Citizen's Weekly Commentary, A Women (UN program).

RADIO PRAGUE

0000 D News; 0005 S Readings from Czech Literature, M Letter from Prague, T-A Current Affairs; 0010 S Saturday Music (classical/folk/jazz), M The Arts; 0015 M Mailbox, T Spotlight (Czech current events) or One on One (interview), H Czechs in History or Central Europe Today, A Magazine; 0020 W Talking Point, F Economic Report.

RADIO UKRAINE INTERNATIONAL

0100 D News; 0106 M Hello From Kiev (listener letters/music); 0010 T-S Ukraine Today (magazine); 0018 S Baroque (the arts); 0020 M Music from Ukraine; 0025 T-F Closeup (current issues).

VOICE OF AMERICA (News Now)

0000 T-A World News; 0010 T-A Regional News; 0014 T-A USA News; 0018 T-A Sports; 0022 T-A Features; 0030 T-A World News; 0033 T Encounter, W Our World, H Kaleidoscope, F Best of 'Talk to America' A Press Conference USA.

WBCQ, Maine

7415 kHz.: 0000 S A Different Kind of Oldies Show, M Radio New York International, T Off the Hook, A Allan Weiner Worldwide.

9335 kHz.: 0000 S American Bizarre.

WHRI, Indiana

5745 kHz.: 0000 S DXing with Cumbre; 0030 S World Harvest Country Style.

7315 kHz.: 0005 A Music (Christian contemporary/gospel).

7580 kHz.: 0000 T-A For the People (from 2305).

WWCR, Tennessee

3210 kHz.: 0000 S The Big Backyard (Australian country music).

0100 UTC/ 9pm E/6pm P - Page 43 Freqs

BBC WORLD SERVICE (am)

0100 S The World Today, M-A News; 0105 M Wright Around the World (musical variety), T Health Matters, W Go Digital, H Sports International, F One Planet (ecology), A Discovery (science); 0130 S Reporting Religion, T Everywoman, W Focus on Faith, H Pick of the World (BBC's best), F People & Places, A Essential Guide; 0145 S Letter from America (Alistair Cooke comments).

CHINA RADIO INTERNATIONAL

0100 D News; 0110 S Report on Developing Countries, M-F Current Affairs, A Biz China; 0120 S In the Spotlight (cultural magazine); 0130 M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China, A Listeners' Garden.

DEUTSCHE WELLE

0100 D News; 0105 S Talking Point (journalists), M Religion & Society, T-A Newslink (European current affairs); 0115 S Inside Europe, M Arts on the Air; 0130 T Insight (international affairs), W Man & Environment, H Living in Germany, F Hard to Beat: The World of Sport, A German by Radio.

HCB, Ecuador

0100 S DX Partyline, M Musical Mailbag, T-A Latin American & World News; 0110 T-A Studio 9 (Latin American regional report including T Inside HCB, W/F Did You Hear? (news comment), H Ham Radio Today, A Musica del Ecuador); 0130 S Saludos Amigos, M Mountain Meditations, T-A A New Beginning; 0145 T-A A Slice of Infinity.

RADIO AUSTRALIA

0100 D News; 0105 S In Conversation, A Asia Pacific (regional current affairs); 0110 M-F Asia Pacific; 0130 S Oz Sounds (new releases), M Health Report, T Law Report, W Religion Report, H Media Report, F The Sports Factor, A RA Arts.

RADIO AUSTRIA INTERNATIONAL

0130 D Report from Austria (magazine); 0135 S Week in Review, M Network Europe; 0150 S Listener Letters.

RADIO BUDAPEST

0100 D News; 0110 S DX Blockbuster; M Europe Unlimited (trade) or Heading for Hungary (travel) or Spotlight (culture) or And the Gatepost (letters), T-A Hungary Today (current events magazine).

RADIO CANADA INTERNATIONAL

0100 D News; 0105 S Business Sense, M Maple Leaf Mailbag (w/CIDX report bimonthly); 0110 T-A Canada Today (current events magazine); 0135 S/A Canada in the World, M/H Spotlight (arts & culture), T Media Zone (journalists discuss), W Maple Leaf Mailbag (w/CIDX report bimonthly), F Business Sense.

RADIO HABANA CUBA

0100 D International News; 0110 M Weekly Review, T-S National News; 0115 T-S Viewpoint; 0130 M RHC 40 Years, T-S News Bulletin; 0135 T-A Time Out (sports); 0140 S/W DXers Unlimited, M Mailbag Show, T/H/F Caribbean Outlook, A Weekly Review; 0150 M Breakthrough (science report).

RADIO NETHERLANDS

0100 S/M News, T-A Newslines; 0105 S Europe Unzipped, M Wide Angle (week in review).

RADIO NEW ZEALAND INTERNATIONAL

0100 D RNZ News; 0106 S Film Show, M-F Cadenza (light classics), A Home Grown (NZ music, including Musical Chairs-artist feature 0130); 0130 S Bookmarks.

RADIO FOR PEACE INT'L, COSTA RICA

0100 S Making Contact, M Every Living Thing (nature), T Disability Radio Worldwide, W World of Radio, H A Public Affair, F Far Right Radio Review, A Continent of Media; 0130 S Alternative Radio (political/social analysis), T Earthspan (War & Peace Foundation), W RFPI Mailbag, A World of Radio.

RADIO PRAGUE

0100 D News; 0105 S Readings from Czech Literature, M Letter from Prague, T-A Current Affairs; 0110 S Saturday Music (classical/folk/jazz), M The Arts; 0115 M Mailbox, T Spotlight (Czech current events) or One on One (interview), H Czechs in History or Central Europe Today, A Magazine; 0120 W Talking Point, F Economic Report.

RTE, Ireland

0130 S/M Sportsnews; T-A The News at Six.

VOICE OF AMERICA (News Now)

0100 T-A World News; 0110 T-A Regional News; 0114 T-A USA News; 0118 T-A Sports; 0122 T-A Features; 0130 T-A World News; 0133 A (to be announced); 0136 T-F Dateline (news magazine); 0145 T-F Science; 0149 T-F Business; 0154 T-F Feature.

VOICE OF AMERICA (Special English)

0130 T-A News; 0140 T Agriculture Today, W/H Science Report, F Environment Report, A In the News; 0145 T Science in the News, W Explorations, H Making of a Nation, F American Mosaic, A American Stories.

VOICE OF RUSSIA

0100 D News; 0111 S News & Views, M Sunday Panorama, T-A Commonwealth Update; 0124 M Russia: People & Events; 0130 D News in Brief; 0132 S Moscow Yesterday & Today, M Timelines, T Folk Box, W Jazz Show, H Musical Portraits of the 20th Century, F Yours for the Asking, A Christian Message from Moscow; 0146 F Music At Your Request; 0154 H Russia: People & Events.

VOICE OF VIETNAM

0100 D News; 0105 D Current Affairs; 0110 Su Weekly Review, M Sunday Show, T/W/F/A Press Review, H Talk of the Week; 0115 T Vietnam: Land & People, W Culture & Society, H Letterbox, F Vietnam Economy, A Rural Vietnam; 0120 S Music, A Literature and Arts.

WBCQ, Maine

7415 kHz.: 0100 S Marion's Attic (vintage recordings), F Tasha Takes Control.

WHRI, Indiana

7315 kHz.: 0105 S/M Music (Christian contemporary/gospel), T-A For the People (populist phone-in).

WWCR, Tennessee

5070 kHz.: 0145 S Ask WWCR (letters).

0200 UTC/ 10pm E/7pm P - Page 43 Freqs

BBC WORLD SERVICE (am)

0200 D The World Today; 0230 S From Our Own Correspondent, M Assignment, T-A World Business Report; 0245 T/W/F/A Analysis, H From Our Own Correspondent.

BBC WORLD SERVICE (me)

0200 D The World Today; 0230 S From Our Own Correspondent, A Global Business.

HCB, Ecuador

0200 S Rock Solid, M Hour of Decision, T-A Insight for Living; 0228 T-A Money Minute; 0230 M Renewing Your Mind, T-A Back to the Bible; 0255 T-A Joni and Friends.

RADIO AUSTRALIA

0200 D News; 0205 S Margaret Throsby (interviews and music), A Background Briefing (documentary); 0210 M-F The World Today (ABC Radio flagship news program).

[Special service: 0205 S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

RADIO BUDAPEST

0230 D News; 0240 S DX Blockbuster; M Europe Unlimited (trade) or Heading for Hungary (travel) or Spotlight (culture) or And the Gatepost (letters), T-A Hungary Today (current events magazine).

RADIO BULGARIA

0200 D News; 0210 S Views Behind the News, M Folk Studio (Bulgarian folk

Shortwave Guide



music), T-A Events and Developments; **0220** T Sports; **0225** W-S Timeout for Music; **0230** T Bulgarian Plaza (cultural magazine) or Walks and Talks (interesting places); **0235** T Answering Your Letters, W-M Keyword Bulgaria (Bulgaria and things Bulgarian); **0245** S RADIO BULGARIA Calling (for radio hobbyists), W Magazine Economy, H Arts and Artists, F History Club, A The Way We Live.

RADIO HABANA CUBA

0200 D International News; **0210** M From Habana, T-S National News; **0215** T-S Reports and music; **0230** M The Jazz Place, T-S News Bulletin; **0235** S World of Stamps, T-A Reports and music; **0245** S RHC 40 Years; **0250** S Cuban music.

RADIO KOREA INTERNATIONAL

0200 D News; **0210** S Seoul Report (week in review), M Korean Pop Interactive (requests), T-A News Commentary; **0215** T-A Seoul Calling (magazine); **0230** S From Us to You (letters), M Multiwave Feedback (letters/DX news), T Exploring the New Millennium, W Cultural Promenade, H Economic Radar, F Korea & Its Splendors, A Notes of Nostalgia (traditional music).

RADIO NEW ZEALAND INTERNATIONAL

0200 D RNZ News; **0205** S Eureka! (science)*, M-F In Touch with New Zealand (music/variety), A Home Grown (from 0106)*; **0230** S Health Matters or Environment Matters*.

[* may be preempted by live sport].

RADIO FOR PEACE INT'L, COSTA RICA

0200 S Alternative Radio (from 0130), M New Dimensions, T University Forum (interviews), W Continent of Media, H WINGS (women's news), F Radio Nation ("The Nation"), A RFPI Mailbag; **0230** S Far Right Radio Review, T Honoring Mother Earth: Indigenous Voices, W/A University of the Air (peace studies), H Global Community Forum (interviews), F A Woman's Voice.

RADIO ROMANIA INTERNATIONAL

0200 D Radio Newsreel; **0210** S The Week, M Focus, T-A Commentary; **0215** S World of Culture, M Sunday Studio, T Pro Memoria (history), W Business Club, H Society Today, F Cards on the Table (debate) or The Romanian Next to You (interview), A Challenge for the Future or Terra 2001; **0220** S RRI Encyclopedia, T Political Flash, W European Horizons; **0225** S Roots (culture/traditions), M Romanian by Radio, T/H/A Business Update, W Tourist News, F Listeners' Letterbox; **0230** S Radio Pictures, M Romanian Itineraries, T Pulse of Transition, W W Mother Nature (ecology), H Visit Romania, A Practical Guide; **0235** S Romanian Itineraries, M Listeners' Letterbox, T Performing Arts, W Youth Club, H Partners in a Changing World, A Cultural Survey; **0240** S, Bucharest Along the Centuries, T Pages of Romanian Literature, W/F Skylark (folk music), H Stage and Screen, A Spectator (voice of the people); **0245** S DX Mailbag, T Romanian Hits, H Romanian Musicians, A Romanian Folk Music At Its Best; **0250** M Romanian Folk Music At Its Best, T Sports Roundup, W Athlete of the Week, H Sports Club, F Football Flash, A Sports Weekend.

RADIO SWEDEN

0230 S Weekend (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th), M In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), T-A Sixty Degrees North (regional report); **0245** T Sports Scan, W Close Up (profiles of Swedes-1st/3rd), H Money Matters, F Nordic Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), A Review of the Newsweek.

RADIO TAIPEI INTERNATIONAL

0200 D News; **0215** S Great Wall Forum (discussing the mainland), M Jade Bells & Bamboo Pipes (traditional music), T Culture Express, W Taiwan Today, H Instant Noodles, F Taipei Magazine, A Groove Zone; **0230** S Mailbag Time, T Trends, W Confucius and Inspiration Beyond, H Life Unusual, F People; **0245** M-F Let's Learn Chinese (M/W/F elementary, T/H intermediate), A Kaleidoscope (life in Taiwan).

[This schedule also airs at **0700** for western North America.]

VOICE OF RUSSIA

0200 D News; **0211** S/W/H Moscow Mailbag, T/F Science & Engineering, W/A Newmarket (business); **0230** D News in Brief; **0232** S Songs from Russia, M This is Russia, T Kaleidoscope (Russian events), W Musical Portraits of the 20th Century, H Moscow Yesterday & Today, F Russian by Radio, A Audio Book Club (Russian lit.); **0246** S You Write to Moscow; **0254** W Russia: People & Events.

VOICE OF VIETNAM

0230 D News; **0235** D Current Affairs; **0240** Su Weekly Review, M Sunday Show, T/W/F/A Press Review, H Talk of the Week; **0245** T Vietnam: Land & People, W Culture & Society, H Letterbox, F Vietnam Economy, A Rural Vietnam; **0250** S Music, A Literature and Arts.

WBCQ, Maine

7415 kHz.: **0200** S Pocket Calculator.

WHRI, Indiana

7315 kHz.: **0205** M Music (Christian contemporary/gospel), T-A For the People (from 0105).

7580 kHz.: **0200** S Life from Studio B; **0205** M Music (Christian contemporary/gospel); **0230** S World Harvest Country Style, M DXing with Cumbre.

WWCR, Tennessee

3210 kHz.: **0205** M Golden Age of Radio Theatre.

5070 kHz.: **0230** S World of Radio.

0300 UTC/ 11pm E/8pm P - Page 44 Freqs

BBC WORLD SERVICE (am)

0300 S/M World Briefing, T-A News; **0305** T The Hitch-Hiker's Guide to the Galaxy, W The Alternative (music), H Greenfield Collection (classical music), F Jazzmatazz, A Composer of the Month; **0320** S/M Sports Roundup; **0330** S Science in Action, M Westway Omnibus (drama serial), T Health in Mind, W Patterns of Faith, H What is Civil Society?, F Heart & Soul (religion), A Write On (letters) or From Where I Stand (British views); **0345** T-A Off the Shelf (book readings).

BBC WORLD SERVICE (me)

0300 D World Briefing; **0320** D Sports Roundup; **0330** S Science in Action, M World Business Review, T-A World Business Report; **0345** M Write On or From Where I Stand (British views), T/W/F/A Analysis, H From Our Own Correspondent.

BBC WORLD SERVICE (esaf)(wcaf)

0300 D World Briefing; **0320** D Sports Roundup; **0330** S Postmark Africa, M-F Network Africa, A African Quiz or This Week And Africa.

BBC WORLD SERVICE (sas)

0300 S World Briefing, M-A News; **0305** M Talking Point, T-A Outlook; **0320** S Sports Roundup; **0330** S Science in Action; **0345** M-F Off the Shelf (book readings), A Write On or From Where I Stand (British views).

CHANNEL AFRICA

0300 S Network Africa (week in review), M-F Dateline Africa (news magazine), A CHANNEL AFRICA Sport.

CHINA RADIO INTERNATIONAL

0300 D News; **0310** S Report on Developing Countries, M-F Current Affairs, A Biz China; **0320** S In the Spotlight (cultural magazine); **0330** M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China, A Listeners' Garden.

DEUTSCHE WELLE

0300 D News; **0305** S Saturday Review, M Sunday Review, T-A Newslink (European current affairs); **0315** S Spectrum (sci/tech), M Arts on the Air; **0330** T Insight (international affairs), W Man & Environment, H Living in Germany, F Hard to Beat: The World of Sport, A German by Radio.

HCB, Ecuador

0300 S Inspirational Classics (liturgical classical music), M The Sower, T-A Stories of Great Christians; **0315** M The Word Today, T-A Rendezvous (inspirational music); **0330** S Did You Hear (news comment), M Unshackled (radio's oldest drama series), T Let My People Think (apologetics), W Words for Women, H Adventures in Odyssey (children), F Book & the Spade (religion & archaeology), A Walkin' in the Sunshine (country music); **0345** S Specialized English, W Wonderful Words of Life (hymns), F Science, Scripture & Salvation.

RADIO AUSTRALIA

0300 D News; **0305** S Feedback (letters/station news), A Rural Reporter; **0310** M-F Regional Sports Report; **0320** M-F Pacific Focus (M business, T health, W environment, H sport, F culture); **0330** S All in the Mind (the brain), A Time to Talk (the Pacific region); **0340** M Oz Music Show (rock), T Music Deli (diverse world/folk); W Blacktracker (contemporary Aboriginal), H Australian Country Style, F Jazz Notes.

[Special service: **0305** S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

RADIO HABANA CUBA

0300 D International News; **0310** M Weekly Review, T-S National News; **0315** T-S Viewpoint; **0330** M RHC 40 Years, T-S News Bulletin; **0335** T-A Time Out (sports); **0340** S/W DXers Unlimited, M/H Mailbag Show, T/F Caribbean Outlook, A Weekly Review; **0350** M Breakthrough (science report).

RADIO NEW ZEALAND INTERNATIONAL

0300 S/A RNZ News*, M-F Pacific Regional News; **0305** S Maori feature*, A Music feature*; **0308** M Tagata o te Moana (Pacific culture), T Top 5, W Pacific Report, H Mailbox (letters & DX news) or RNZI Talk (meet the RNZI staff), F Dateline Pacific; **0330** T New Releases, W Tradewinds, H The World in Sport, F Pacific Correspondent. [* may be preempted by live sport].

RADIO FOR PEACE INT'L, COSTA RICA

0300 S Far Right Radio Review (from 0230), M Voices of Our World (Maryknoll program), T Honoring Mother Earth: Indigenous Voices (from 0230), W Living Enrichment Center, H Global Community Forum (from 0230), F A Woman's Voice (from 0230), A Earthspan (War & Peace Foundation); **0330** S World Citizens Weekly Commentary, M Perspective (UN program), T In the Moment, W Peace Forum, H Scope (UN program), F Tropical Conservation Newshour (rainforests), A Newsmaker Report; **0345** S/M Hightower Report (commentary), T-A UN Today; **0350** S/M Earthwatch (ecology); **0355** S/M Earth & Sky (astronomy).

RADIO PRAGUE

0300 D News; **0305** S Readings from Czech Literature, M Letter from Prague, T-A Current Affairs; **0310** S Saturday Music (classical/folk/jazz), M The Arts; **0315** M Mailbox, T Spotlight (Czech current events) or One on One (interview), H Czechs in History or Central Europe Today, A Magazine; **0320** W Talking Point, F Economic Report.

RADIO SWEDEN

0330 S Weekend (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th), M In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), T-A Sixty Degrees North (regional report); **0345** T Sports Scan, W Close Up (profiles of Swedes-1st/3rd), H Money Matters, F Nordic Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), A Review of the Newsweek.

RADIO TAIPEI INTERNATIONAL

0300 D News; **0315** S Great Wall Forum (discussing the mainland), M Taiwan Economic Journal, T Culture Express, W New Music Lounge, H Instant Noodles, F Weekend Zoo, A Kaleidoscope (life in Taiwan); **0330** S Asia Pacific, M People, T Trends, H Life Unusual, A Mailbag Time; **0345** M-F Let's Learn Chinese (M/W/F elementary, T/H intermediate), A Best of Nalunan.

VOICE OF RUSSIA

0300 D News; **0311** M Sunday Panorama, T-S News & Views; **0324** M Russia: People & Events; **0330** D News in Brief; **0332** S Kaleidoscope (Russian events), M Audio Book Club (Russian lit.), T/H/A 20th Century, W/F Russian history/culture.

VOICE OF VIETNAM

0330 D News; **0335** D Current Affairs; **0340** Su Weekly Review, M Sunday Show, T/W/F/A Press Review, H Talk of the Week; **0345** T Vietnam: Land & People, W Culture & Society, H Letterbox, F Vietnam Economy, A Rural Vietnam; **0350** S Music, A Literature and Arts.

WBCQ, Maine

7415 kHz.: **0300** S Zombo's Mondo Record Party.

WHRI, Indiana

5745 kHz.: **0302** S 20, The Countdown Magazine (Christian rock music charts); **0305** T-A Music (Christian contemporary/gospel).

7315 kHz.: **0302** S 20, The Countdown Magazine (Christian rock music charts); **0305** M Music (Christian contemporary/gospel); **0330** M DXing with Cumbre.

7580 kHz.: **0305** T-A Music (Christian contemporary/gospel); **0335** S Music (Christian contemporary/gospel).

WRMI, Florida

7385 kHz.: **0330** M Wavescan.

WWCR Tennessee

5070 kHz.: **0300** S Spectrum (communications discussion).

0400 UTC/ 12am E/9pm P - Page 44 Freqs

BBC WORLD SERVICE (am)

0400 D The World Today; **0430** S Global Business, A Assignment; **0450** M-F Sports Roundup.

BBC WORLD SERVICE (eu)

0400 D The World Today; **0430** S Global Business, A Weekend; **0450** M-F Sports Roundup.

Shortwave Guide



BBC WORLD SERVICE (me)

0400 D The World Today; **0430** S In Praise of God, A Assignment; **0450** M-F Sports Roundup.

BBC WORLD SERVICE (af)

0400 D The World Today; **0430** S African Perspective, M-F Network Africa, A Talkabout Africa.

BBC WORLD SERVICE (sas)

0400 S/A The World Today, M-F News; **0405** M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Music, H Meridian Writing, F Omnibus (documentary); **0430** S In Praise of God, M Music Mix, T UK Top 20, W/F Westway (soap opera), H World of Music, A Assignment; **0445** W UK Album Chart, F Music X-Press.

CHANNEL AFRICA

0400 S Network Africa (week in review), M-F Dateline Africa (news magazine), A CHANNEL AFRICA Sport.

China Radio International

0400 D News; **0410** S Report on Developing Countries, M-F Current Affairs, A Biz China; **0420** S In the Spotlight (cultural magazine); **0430** M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China, A Listeners' Garden.

HCB, Ecuador

0400 S DX Partyline, M Musical Mailbag, T-A Latin American & World News; **0410** T-A Studio 9 (Latin American regional report including T Inside HCB, W/F Did You Hear? (news comment), H Ham Radio Today, A Musica del Ecuador); **0430** S Saludos Amigos, M Mountain Meditations, T-A A New Beginning; **0445** T-A A Slice of Infinity.

RADIO AUSTRALIA

0400 D News; **0405** S/A Pacific Focus (S arts, A environment); **0410** M-F Margaret Throsby (interviews and music); **0430** S RA Arts, A The Buzz (technology issues).

[Special service: **0405** S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

RADIO HABANA CUBA

0400 D International News; **0410** M From Habana, T-S National News; **0415** T-S Reports and music; **0430** M The Jazz Place, T-S News Bulletin; **0435** S World of Stamps, T-A Reports and music; **0445** S RHC 40 Years; **0450** S Cuban music.

RADIO NETHERLANDS

0430 S/M News; T-A Newline; **0435** S Europe Unzipped, M Sincerely Yours (letters); **0455** S Insight (commentary), M The Week Ahead (program guide).

RADIO NEW ZEALAND INTERNATIONAL

0400 D RNZ News; **0408** S Playhouse (radio theatre), M-F In Touch with New Zealand (from 0205), A Tagata o te Moana (Pacific culture).

RADIO FOR PEACE INT'L, COSTA RICA

0400 S CounterSpin (media analysis), M Music Medicine, T-A Democracy Now! (Pacifica Radio's daily report); **0430** S Freespeech Radio News (repeat of Fri. newscast).

RADIO ROMANIA INTERNATIONAL

0400 D Radio Newsreel; **0410** S The Week, M Focus, T-A Commentary; **0415** S World of Culture, M Sunday Studio, T Pro Memoria (history), W Business Club, H Society Today, F Cards on the Table (debate) or The Romanian Next to You (interview), A Challenge for the Future or Terra 2001; **0420** S RRI Encyclopedia, T Political Flash, W European Horizons; **0425** S Roots (culture/traditions), M Romanian by Radio, T/H/A Business Update, W Tourist News, F Listeners' Letterbox; **0430** S Radio Pictures, M Romanian Itineraries, T Pulse of Transition, W Mother Nature (ecology), H Visit Romania, A Practical Guide; **0435** S Romanian Itineraries, M Listeners' Letterbox, T Performing Arts, W Youth Club, H Partners in a Changing World, A Cultural Survey; **0440** S, Bucharest Along the Centuries, T Pages of Romanian Literature, W/F Skylark (folk music), H Stage and Screen, A Spectator (voice of the people); **0445** S DX Mailbag, T Romanian Hits, H Romanian Musicians, A Romanian Folk Music At Its Best; **0450** M Romanian Folk Music At Its Best, T Sports Roundup, W Athlete of the Week, H Sports Club, F Football Flash, A Sports Weekend.

RADIO UKRAINE INTERNATIONAL

0400 D News; **0406** M Hello From Kiev (listener letters/music); **0410** T-S Ukraine Today (magazine); **0418** S Baroque (the arts); **0420** M Music from Ukraine; **0425** T-F Closeup (current issues).

RADIO VLAANDEREN INTERNATIONAL

0400 S Music from Flanders, M Radio World, T-A News; **0404** T-A Belgium Today;

0408 M Tourism in Flanders, T-A Press Review; **0413** T Focus on Europe, W Green Society (ecology), H/A Around the Arts, F Economics; **0414** M Brussels 1043 (letters); **0418** T Sports, H Around Town, F International Report, A Tourism in Flanders; **0424** M-A Soundbox (Flemish rock).

VOICE OF RUSSIA

0400 D News; **0411** S/M Musical Portraits of the 20th Century, T/F Moscow Mailbag, W/A Science and Engineering, H Newmarket (business); **0430** D News in Brief; **0432** S/A Timelines, M Jazz Show, T Yours for the Asking, W Moscow Yesterday & Today, H Folk Box, F Audio Book Club (Russian lit.); **0447** T Music At Your Request.

WBCQ, Maine

7415 kHz.: **0400** S Tom & Darryl (electronic media), M-A Amos 'n Andy.

WHRI, Indiana

5745 kHz.: **0400** S 20, The Countdown Magazine (from 0302).
7315 kHz.: **0400** S 20, The Countdown Magazine (from 0302); **0405** M-F Music (Christian contemporary and gospel).
7580 kHz.: **0430** A DXing with Cumbre.

WRMI, Florida

7385 kHz.: **0430** S Viva Miami (magazine).

WWCR, Tennessee

3210 kHz.: **0400** S Cyber Line (computers).
5070 kHz.: **0400** S Cyber Line (computers).

0500 UTC/ 1am E/10pm P - Page 45 Freqs

BBC WORLD SERVICE (eu)

0500 D The World Today; **0530** S Reporting Religion, A Arts in Action.

BBC WORLD SERVICE (me)

0500 D The World Today; **0530** S Global Business, A Arts in Action.

BBC WORLD SERVICE (esaf)

0500 D The World Today; **0530** S Artbeat, M-F Network Africa, A African Quiz or This Week And Africa.

BBC WORLD SERVICE (wcaf)

0500 D The World Today; **0530** S Artbeat, M-F Network Africa, A Talkabout Africa.

BBC WORLD SERVICE (sas)

0500 S The World Today, M-A News; **0505** M One Planet (ecology), T Discovery (science), W Health Matters, H Go Digital, F Sports International, A Wright Around the World (music requests); **0530** S Reporting Religion, M People and Places, T Essential Guide, W Everywoman, H Focus on Faith, F Pick of the World.

BBC WORLD SERVICE (eas)

0500 D The World Today; **0530** S Write On or From Where I Stand (British views), A Arts in Action.

CHANNEL AFRICA

0500 S Network Africa (week in review), M-F Dateline Africa (news magazine), A CHANNEL AFRICA Sport.

DEUTSCHE WELLE

0500 D News; **0505** S Talking Point (journalists), M Religion & Society, T-A Newslink (European current affairs); **0515** S Marks & Markets, M COOL! (youth magazine); **0530** T Insight (international affairs), W Man & Environment, H Living in Germany, F Hard to Beat: The World of Sport, A German by Radio.

HCB, Ecuador

0500 S Inspirational Classics (liturgical classical music), M Renewing Your Mind, T-S Family Life Today; **0530** S Did You Hear (news comment), M Unshackled (oldest drama on radio), T Let My People Think (apologetics), W Words for Women, H Adventures in Odyssey (children), F Book & the Spade (religion and archaeology), A Walkin' in the Sunshine (country music); **0545** S Specialized English, W Wonderful Words of Life (hymns), F Science, Scripture & Salvation.

RADIO AUSTRALIA

0500 D News; **0505** S/A Pacific Focus (S business, A sport); **0510** M-F Pacific Beat (Pacific islands magazine w/regional sports report 0530); **0530** S Fine Music Australia (classical), A Lingua Franca (about language); **0545** A Short Story.
[Special service: **0505** S/A Grandstand (live sports action) on 9660, 12080, 17580, 21725 kHz. only.]

RADIO HABANA CUBA

0500 D International News; **0510** M Weekly Review, T-S National News; **0515** T-S Viewpoint; **0530** M RHC 40 Years, T-S News Bulletin; **0535** T-A Time Out (sports); **0540** S/W DXers Unlimited, M/H Mailbag Show, T/F Caribbean Outlook, A Weekly Review; **0550** M Breakthrough (science report).

RADIO JAPAN

0500 D News; **0510** S Pop Goes Asia, A Hello from Tokyo (listener contact); **0515** M-F 44 Minutes (feature magazine).

RADIO NETHERLANDS

0500 S Roughly Speaking (Euro youth culture), M Dutch Horizons, T Research File (science), W Music 52-15 (international music), H Documentary, F The Sound Fountain (ideas), A A Good Life (global development).

RADIO NEW ZEALAND INTERNATIONAL

0500 D RNZ News; **0505** S Spiritual Outlook, M-F Checkpoint (comprehensive news), A Best of Kim Hill (interviews).

RADIO FOR PEACE INT'L, COSTA RICA

0500 S TUC Radio, M Neumaier Report, T Between the Lines, W A Woman's Voice, H Alternative Radio, F Making Contact (reports & interviews), A Honoring Mother Earth: Indigenous Voices; **0515** M Living Enrichment Center; **0530** S Continent of Media, T TUC Radio, F Steppin' Out of Babylon.

VOICE OF NIGERIA

0500 S/A News Summary, M-F VON Scope, A African Safari (music); **0505** S VON Link-Up, A African Safari; **0530** D News about Nigeria; **0540** D News About Africa; **0545** D World News; **0555** D Commentary.

WBCQ, Maine

7415 kHz.: **0500** S Tom and Darryl (electronic media-1st/3rd wks.), H World of Radio, A The Clone Zone

WHRI, Indiana

5745 kHz.: **0500** A DXing with Cumbre; **0530** A World Harvest Country Style.
7315 kHz.: **0500** M-F Music (Christian contemporary and gospel), A DXing with Cumbre; **0530** A World Harvest Country Style.
7580 kHz.: **0500** A World Harvest Country Style.

WWCR, Tennessee

3210 kHz.: **0500** M World of Radio; **0505** A Rock the Universe (Christian rock music).
5070 kHz.: **0500** S World Wide Country Radio (music), T Ask WWCR (letters); **0505** M A View from Europe.

0600 UTC/ 2am E/11pm P - Page 45 Freqs

BBC WORLD SERVICE (eu)

0600 D World Briefing; **0620** D Sports Roundup; **0630** S Agenda (trends), M-F World Business Report, A People and Politics; **0645** M Letter from America (Alistair Cooke comments), T/W/F Analysis, H From Our Own Correspondent.

BBC WORLD SERVICE (me)(esaf)

0600 S World Briefing, M-A News; **0605** M Talking Point, T-A Outlook; **0620** S Sports Roundup; **0630** S Agenda (trends); **0645** M-F Off the Shelf (book readings), A Write On or From Where I Stand (British views).

BBC WORLD SERVICE (wcaf)

0600 D World Briefing; **0620** D Sports Roundup; **0630** S Agenda (trends), M-F Network Africa, A African Quiz or This Week And Africa.

BBC WORLD SERVICE (eas)

0600 S/A World Briefing, M-F News; **0605** M Omnibus (documentary), T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Music, F Meridian-Writing; **0620** S/A Sports Roundup; **0630** S Westway Omnibus, M Composer of the Month, T Music Mix, W UK Top 20, H The Hitch-Hiker's Guide to the Galaxy, F World of Music, A People and Politics.

CHANNEL AFRICA

0600 S Network Africa (week in review), M-F Dateline Africa (news magazine), A CHANNEL AFRICA Sport.

RADIO AUSTRALIA

0600 D News; **0605** S The Europeans, A Feedback (letters/station news); **0610** M-F Regional Sports Report; **0620** M-F Pacific Focus (M business, T health, W environment, H sport, F culture); **0630** A Oz Sounds (new releases); **0634** S Ockham's Razor (a science issue); **0640** M Oz Music Show (rock), T Music Deli (diverse world/folk), W Blacktracker (contemporary Aboriginal), H Australian Country Style, F Jazz Notes.
[Special service: **0605** S/A Grandstand (live sports action) on 9660, 12080, 17580,

Shortwave Guide



21725 kHz. only.]

RADIO HABANA CUBA

0600 D International News; **0610** M From Habana, T-S National News; **0615** T-S Reports and music; **0630** M The Jazz Place, T-S News Bulletin; **0635** S World of Stamps, T-A Reports and music; **0645** S RHC 40 Years; **0650** S Cuban music.

RADIO JAPAN

0600 D News; **0610** S Weekend Square (Japanese life), A Pop Goes Asia; **0615** M-F Asian Top News (headlines from region's radio); **0625** M Unforgettable Musical Masterpieces, T Let's Learn Japanese, W Japan Music Log, H Brush Up Your Japanese, F Music Beat.

RADIO NEW ZEALAND INTERNATIONAL

0600 D RNZ News; **0606** S Whenua (Maori magazine), M-F What's Going On? (arts & entertainment calendar), A Feature; **0630** M Letter from America (BBC), T-H Today in Parliament, F The Pacific Report, A In a Mellow Tone (soft sounds); **0645** M-F Storytime.

RADIO FOR PEACE INT'L, COSTA RICA

0600 S World of Radio, M Spiritual Awakening, T-A Freespeech Radio News; **0630** S RFP Mailbag, M One World—One Family (Bahai program), T/H/A Hightower Radio (commentary), W Radio Nation ("The Nation"), F This Way Out (gays magazine); **0635** T/H/A Earthwatch (ecology); **0640** T/H/A Earth & Sky (astronomy); **0645** T Tropical Conservation Newsbureau (rainforests), H World Citizen's Weekly Commentary, A Women (UN program).

VOICE OF NIGERIA

0600 S This Week on VON, M-F Moving On, A Weekend Magazine; **0615** S Soul Lift; **0630** S/A Reporter's Diary, M-F African Press; **0645** S From the Racks, M-F Insight, A Listeners' Letters.

WHRI, Indiana

5745 kHz.: **0630** S DXing with Cumbria.
7315 kHz.: **0604** A Turn Your Radio On; **0630** S World Harvest Country Style.

WWCR, Tennessee

3210 kHz.: **0600** S The Big Backyard (Australian country music), M Spectrum (communications discussion); **0605** T-F World Wide Country Radio (music).
5070 kHz.: **0605** S This Week in Americana (antiques); **0630** S World of Radio.

1000 UTC/6am E/3am P - Page 47 Freqs

BBC WORLD SERVICE (am)

1000 D World Briefing; **1020** S/A Sports Roundup; **1030** S Agenda (trends), M-F World Business Report, A Science in Action; **1045** M-F Sports Roundup.

BBC WORLD SERVICE (eu)

1000 D World Briefing; **1020** S/A Sports Roundup; **1030** S Weekend, M-F World Business Report, A Science in Action; **1045** M-F Sports Roundup.

BBC WORLD SERVICE (me)

1000 D World Briefing; **1020** S/A Sports Roundup; **1030** S Agenda (trends), M-F World Learning (instructional series), A Science in Action.

BBC WORLD SERVICE (esaf)

1000 S News Summary, M-A World Briefing; **1005** S The Alternative (music); **1020** A Sports Roundup; **1030** S Composer of the Month, M Letter from America, T-F Analysis, A Science in Action; **1045** M-F Sports Roundup.

BBC WORLD SERVICE (wcaf)

1000 S News Briefing, A World Briefing; **1001** S Heart and Soul (religion); **1020** S The Alternative (music), A Sports Roundup; **1030** A Science in Action; **1045** A What is Civil Society?.

BBC WORLD SERVICE (eas)

1000 S News Summary, M-F World Briefing, A News; **1001** S Concert Hall; **1005** A Jazzmatazz; **1030** M-F World Business Report, A Greenfield Collection (classical music); **1045** M-F Sports Roundup.

RADIO AUSTRALIA

1000 D News; **1005** S The Buzz (technology issues), M-F Asia Pacific, A Pacific Review; **1030** S Rural Reporter, M Health Report, T Law Report, W Religion Report, H Media Report, F The Sports Factor, A In Conversation.

RADIO NEW ZEALAND INTERNATIONAL

1000 D News; **1005** S Mediawatch, M-F Late Edition (the day's news), A Deep Purple (relaxing music/nostalgia).

RADIO FOR PEACE INT'L, COSTA RICA

1000 S CounterSpin (media analysis), M Music Medicine, T-A Democracy Now! (Pacific Radio's daily report); **1030** S Freespeech Radio News (repeat of Fri. newscast).

VOICE OF AMERICA (News Now)

1000 D World News; **1010** D Regional News; **1014** D USA News; **1018** D Sports; **1022** D Features; **1030** D World News; **1033** S On the Line (US foreign policy), A Best of 'Talk to America'; **1045** M-F Science, Medicine, Environment; **1049** M-F Business and Economic Report; **1053** M-F Music feature.

RADIO NETHERLANDS

1030 S/A News, M-F Newslines; **1035** S Wide Angle, A Europe Unzipped; **1055** S The Week Ahead (program guide), A Insight (commentary).

WHRI, Tennessee

6040 kHz.: **1005** A For the People (populist phone-in).
9495 kHz.: **1005** M-F Music (contemporary Christian/Gospel).

WWCR, Tennessee

5070 kHz.: **1000** A The Old Record Shop (vintage recordings).
15685 kHz.: **1015** S Ask WWCR (letters).

1100 UTC/ 7am E/4am P - Page 48 Freqs

BBC WORLD SERVICE (am) (eu)

1100 D World Briefing; **1120** D British News; **1130** S Arts in Action, M Letter from America, T/W/F/A Analysis, H From Our Own Correspondent; **1145** M-H Sports Roundup, F Football Extra. [Special service to the Caribbean on 6195 & 15190 kHz.: **1105** M-F Morning Report; **1110** M-F Caribbean Sport; **1115** M-F Caribbean Magazine.]

BBC WORLD SERVICE (me)

1100 S World Briefing, M-A News; **1105** M Omnibus (documentary), T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Music, F Meridian-Writing, A Wright Around the World (music requests); **1120** S British News; **1130** S Arts in Action, M Composer of the Month, T Music Mix, W UK Top 20, H The Hitch-Hiker's Guide to the Galaxy, F World of Music.

BBC WORLD SERVICE (esaf)

1100 S-F World Briefing, A News; **1105** A Westway Omnibus; **1120** S-F British News; **1130** S Arts in Action, M-F World Business Report, A Greenfield Collection (classical music requests); **1145** M-H Sports Roundup, F Football Extra.

BBC WORLD SERVICE (wcaf)

1100 D World Briefing; **1120** D British News; **1130** S Postmark Africa, M-F World Business Report, A Inside Track (African sport); **1145** M-H Sports Roundup, A Football Extra.

BBC WORLD SERVICE (eas)

1100 S/A World Briefing, M-F News; **1105** M Health Matters, T Go Digital, W Sports International, H One Planet (ecology), F Discovery (science); **1120** S/A British News; **1130** S Play of the Week, M Everywoman, T Focus on Faith, W Pick of the World (best of the BBC), H People and Places, F Essential Guide, A Science in Action.

HCJB, Ecuador

1100 S Let My People Think, M-F Insight for Living, A We Kids; **1128** M-F Money Minute; **1130** S Encounter, M-F Morning in the Mountains (Christian breakfast show w/News 1130, Overcomers 1133, Listen to the Bible 1140, Beyond the Call 1145), A Down Gilead Lane.

RADIO AUSTRALIA

1100 D News; **1105** S Correspondents' Report, M-A Asia Pacific (regional current affairs); **1130** S Business Report, M-F (to be announced), A Fine Music Australia (classical).

RADIO JAPAN

1100 D News; **1110** S Hello from Tokyo (listener contact), A Pop Goes Asia; **1115** M-F Asian Top News (headlines from region's radio); **1125** M Unforgettable Music Masterpieces, T Let's Learn Japanese, W Japan Music Log, H Brush Up Your Japanese, F Music Beat.

RADIO NETHERLANDS

1100 S The Sound Fountain (ideas), M EuroQuest (Europe in context), T A Good Life (development issues), W Dutch Horizons, H Research File (science), F Documentary, A Roughly Speaking (Euro youth culture); **1130** S Dutch Horizons, M Research File, T Music 52-15 (international music), W Documentary, H The Sound Fountain, F A Good Life, A The Sound Fountain.

RADIO FOR PEACE INT'L, COSTA RICA

1100 S TUC Radio, M Neumaier Report, T Between the Lines, W A Woman's Voice, H Alternative Radio, F Making Contact (reports & interviews), A Honoring Mother Earth: Indigenous Voices; **1115** M Living Enrichment Center; **1130** S Continent of Media, T TUC Radio, F Steppin' Out of Babylon.

RADIO NEW ZEALAND INTERNATIONAL

1100 D RNZ News; **1105** S Sportsworld, M-H Kim Hill (interviews), F Sports Story, A The World in Sport; **1130** F Top 5 (music), A NZ News; **1145** A Dateline Pacific.

RADIO SWEDEN

1130 S In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), M-F Sixty Degrees North (regional report)/A Weekend (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (tropical discussion-4th); **1145** M Sports Scan, T Close Up (profiles of Swedes-1st/3rd), W Money Matters, H Nordic Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), F Review of the Newsweek.

WRMI, Florida

9955 kHz.: **1115** S Wavescan; **1130** A Wavescan.

WHRI, Indiana

6040 kHz.: **1105** A For the People (from 1005).
9495 kHz.: **1130** M-F Music (Christian contemporary/gospel).

WWCR, Tennessee

5070 kHz.: **1100** S Ken's Country Classics; **1105** A This Week in Americana (antiques).
15685 kHz.: **1115** A Eco Watch.

1200 UTC/ 8am E/5am P - Page 48 Freqs

BBC WORLD SERVICE (am)(me)(wcaf)

1200 D Newshour.
[Special service to the Caribbean on 6195 & 15220 kHz.: **1205** M-F Caribbean Business; **1210** M-F Morning Report 2nd Edition.]

BBC WORLD SERVICE (eu)

1200 D News; **1205** S The Alternative (music), M-F Outlook (magazine), A Wright Around the World (music requests); **1230** S Global Business; **1245** M What is Civil Society?, T Heart and Soul, W Best of 'The Edge', H Body and Mind, F Patterns of Faith.

BBC WORLD SERVICE (esaf)

1200 S/A Newshour, M-F News; **1205** M-F Outlook (magazine); **1245** M What is Civil Society?, T Heart and Soul, W What's the Problem?, H Body and Mind, F Patterns of Faith.

BBC WORLD SERVICE (eas)

1200 S Play of the Week (cont'd. from 1130), M-A News; **1205** M-F Outlook (magazine), A The Hitch-Hiker's Guide to the Galaxy; **1230** S Agenda (trends), A Assignment; **1245** M Patterns of Faith, T What is Civil Society?, W Heart and Soul, H What's the Problem?, F Body and Mind.

HCJB, Ecuador

1200 S Moody Presents, M-F Morning in the Mountains (cont'd. from 1130 w/News 1200 & 1230, Insights 1205, Sports 1206, Mission Network News 1220, Guidelines for Living 1233, Did You Hear? 1245), A Adventures in Odyssey; **1230** S The Living Word, A Toonz!

RADIO AUSTRALIA

1200 D News; **1205** S Nocturne (innovative music), M-H Late Night Live (discussion and interviews), F Sound Quality (innovative music), A The Spirit of Things (spiritual matters).

RADIO CANADA INTERNATIONAL

1200 M-F News; **1210** M-F This Morning (magazine).

RADIO NETHERLANDS

1200 S/A News, M-F Newslines; **1205** S Sincerely Yours (listener letters), A Europe Unzipped (Europe in context).

RADIO FOR PEACE INT'L, COSTA RICA

1200 S World of Radio, M Spiritual Awakening, T-A Freespeech Radio News; **1230** S RFP Mailbag, M One World—One Family (Bahai program), T/H/A Hightower Radio (commentary), W Radio Nation ("The Nation"), F This Way Out (gays magazine); **1235** T/H/A Earthwatch (ecology); **1240** T/H/A Earth & Sky (as-

Shortwave Guide



tronomy); **1245** T Tropical Conservation Newsbureau (rainforests), H World Citizen's Weekly Commentary, A Women (UN program).

RADIO SWEDEN

1230 S In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), M-F Sixty Degrees North (regional report)A Weekend (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th); **1245** M Sports Scan, T Close Up (profiles of Swedes-1st/3rd), W Money Matters, H Nordic Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), F Review of the Newsweek.

WHRI, Indiana

6040 kHz.: **1200** A DXing with Cumbre; **1230** A World Harvest Country Style. 15105 kHz.: **1230** A DXing with Cumbre.

WWCR, Tennessee

12160 kHz.: **1200** S Dialogue.

YLE Radio Finland

1230 S/F Capital Cafe (conversations), M-H Finland This Morning (magazine), A Finland This Week (review); **1245** A Starting Finnish (language course).

1300 UTC/ 9am E/6am P - Page 49 Freqs

BBC WORLD SERVICE (am)

1300 D News; **1305** S Jazzmatazz, M-F Outlook (magazine), A World Football; **1330** S In Praise of God, A (to be announced); **1345** M-F Off the Shelf (book readings).

BBC WORLD SERVICE (eu)

1300 S/A Newshour, M-F News; **1305** M Omnibus (documentary), T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Music, F Meridian-Writing; **1330** M Composer of the Month, T Music Mix, W UK Top 20, H The Hitch-Hiker's Guide to the Galaxy, F World of Music.

BBC WORLD SERVICE (me)

1300 D News; **1305** S The Alternative (music), M Discovery (science), T Health Matters, W Go Digital, H Sports International, F One Planet (ecology), A Jazzmatazz; **1330** S Global Business, M Essential Guide, T Everywoman, W Focus on Faith, H What's the Problem?, F People and Places.

BBC WORLD SERVICE (wcaf)

1300 D News; **1305** S Concert Hall, M Omnibus (documentary), T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Music, F Meridian-Writing, A Jazzmatazz; **1330** M Composer of the Month, T Music Mix, W UK Top 20, H The Hitch-Hiker's Guide to the Galaxy, F World of Music, A Arts in Action.

BBC WORLD SERVICE (esaf)

1300 D News; **1305** S Concert Hall, M Omnibus (documentary), T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Music, F Meridian-Writing, A Jazzmatazz; **1330** M Composer of the Month, T Music Mix, W UK Top 20, H The Hitch-Hiker's Guide to the Galaxy, F World of Music, A People and Politics.

BBC WORLD SERVICE (eas)

1300 D Newshour; **1350** M-F World Business Report.

CHANNEL AFRICA

1300 S/A CHANNEL AFRICA Extra (weekend variety magazine).

CHINA RADIO INTERNATIONAL

1300 D News; **1310** S Report on Developing Countries, M-F Current Affairs, A Biz China; **1320** S In the Spotlight (cultural magazine); **1330** M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China, A Listeners' Garden.

HCJB, Ecuador

1300 S Viewpoint, M-F Precept, A Toonz! (from 1230); **1313** M-F Getting the Message; **1315** M-F Proclaim; **1330** S Mountain Meditations, M-F Family Life Today, A Rock Solid.

RADIO AUSTRALIA

1300 D News; **1305** S Nocturne (cont'd. from 1205), A The Science Show; **1310** M-F Regional Sports Report; **1315** M-F The Planet (diverse music).

RADIO CANADA INTERNATIONAL

1300 D News; **1305** S The Sunday Edition, M-F This Morning (cont'd. from 1210), A The House (Canadian politics).

RADIO FOR PEACE INT'L, COSTA RICA

1300 S Making Contact, M Every Living Thing (nature), T Disability Radio Worldwide, W World of Radio, H A Public Affair, F Far Right Radio Review, A Continent of Media; **1330** S Alternative Radio (political/social analysis), T Earthspan (War & Peace Foundation), W RFPI Mailbag, A World of Radio.

RADIO SWEDEN

1330 S In Touch with Stockholm (listener contact-1st)/Sounds Nordic (rock music-exc. 1st), M-F Sixty Degrees North (regional report)A Weekend (Europe magazine-1st week)/Sweden Today (2nd)/Spectrum (arts magazine-3rd)/Studio 49 (topical discussion-4th); **1345** M Sports Scan, T Close Up (profiles of Swedes-1st/3rd), W Money Matters, H Nordic Report (1st)/Green Scan (ecology-2nd)/Heart Beat (health-3rd)/The S-Files (things Swedish-4th), F Review of the Newsweek.

WHRI, Indiana

15105 kHz.: **1300** M-F World Harvest Live; **1315** S Music (Christian contemporary and gospel); **1345** A Music (Christian contemporary and gospel).

WRMI, Florida

15725 kHz.: **1330** S Wavescan.

WWCR, Tennessee

15685 kHz.: **1330** S The Old Record Shop (vintage recordings).

1400 UTC/ 10am E/7am P - Page 49 Freqs

BBC WORLD SERVICE (am)

1400 D News; **1405** S Talking Point (global phone-in), M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Music, H Meridian-Writing, F Omnibus (documentary), A Sportsworld (live action); **1430** M Music Mix, T UK Top 20, W/F Westway (drama serial), H World of Music; **1445** W UK Album Chart, F Music X-Press.

BBC WORLD SERVICE (eu)(wcaf)

1400 D News; **1405** S Talking Point (global phone-in), M Discovery (science), T Health Matters, W Go Digital, H Sports International, F One Planet (ecology), A Sportsworld (live action); **1430** M Essential Guide, T Everywoman, W Focus on Faith, H What's the Problem?, F People and Places.

BBC WORLD SERVICE (me)(esaf)

1400 S/A News, M-F World Briefing; **1405** S Talking Point (global phone-in), A Sportsworld (live action); **1420** M-F World Business Report; **1430** M-F British News; **1445** M-H Sports Roundup, F Football Extra.

BBC WORLD SERVICE (eas)

1400 S/A News, M-F East Asia Today; **1405** S Talking Point (global phone-in), A Sportsworld (live action); **1430** M-F British News; **1445** M-H Sports Roundup, F Football Extra.

CHANNEL AFRICA

1400 S/A CHANNEL AFRICA Extra (cont'd. from 1300).

CHINA RADIO INTERNATIONAL

1400 D News; **1410** S Report on Developing Countries, M-F Current Affairs, A Biz China; **1420** S In the Spotlight (cultural magazine); **1430** M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China, A Listeners' Garden.

HCJB, Ecuador

1400 S Renewing Your Mind, M-F Haven, A Rock Solid (from 1330).

RADIO AUSTRALIA

1400 D News; **1405** S Books and Writing, M-F The Planet (cont'd. from 1315), A New Dimensions ("progressive" ideas).

RADIO CANADA INTERNATIONAL

1400 D News; **1405** S The Sunday Edition (cont'd. from 1310), M-F This Morning (cont'd. from 1210), A Vinyl Cafe; **1430** F C'est La Vie (life in French Canada); **1445** M-H Out Front (experimental radio).

RADIO JAPAN

1400 D News; **1410** S Pop Goes Asia, A Weekend Square (Japanese life); **1415** M-F 44 Minutes (feature magazine).

RADIO NETHERLANDS

1430 S/A News, M-F Newline; **1435** S Sincerely Yours (listener letters), A Europe Unzipped (Europe in context); **1455** S The Week Ahead (program guide), A Insight (commentary).

RADIO FOR PEACE INT'L, COSTA RICA

1400 S Alternative Radio (from 1330), M New Dimensions, T University Forum (interviews), W Continent of Media, H WINGS (women's news), F Radio Nation ("The Nation"), A RFPI Mailbag; **1430** S Far Right Radio Review, T Honoring Mother Earth: Indigenous Voices, W/A University of the Air (peace studies), H Global Community Forum (interviews), F A Woman's Voice.

WHRI, Indiana

15105 kHz.: **1430** M-F Music (Christian contemporary and gospel).

1500 UTC/ 11am E/8am P - Page 50 Freqs

BBC WORLD SERVICE (am)

1500 D News; **1501** S Concert Hall; **1505** M One Planet (ecology), T Discovery (science), W Health Matters, H Go Digital, F Sports International, A Sportsworld (live action); **1530** M People & Places, T Essential Guide, W Everywoman, H Focus on Faith, F Pick of the World (BBC's best).

BBC WORLD SERVICE (eu)

1500 S/A News, M-F World Briefing; **1505** S Concert Hall, A Sportsworld (live action); **1530** M-F British News; **1545** M/T/H Analysis, W From Our Own Correspondent, F Analysis or The New Europe.

BBC WORLD SERVICE (me)

1500 D News; **1505** S Concert Hall, M-F Outlook (magazine), A Sportsworld; **1545** M Patterns of Faith, T What is Civil Society?, W Heart and Soul (religion), H What's the Problem?, F Body and Mind (health).

BBC WORLD SERVICE (af)

1500 D News; **1501** S Play of the Week; **1505** M-F Focus on Africa, A Sportsworld; **1530** M-F World Learning (instructional series).

BBC WORLD SERVICE (eas)

1500 D News; **1505** S The Alternative (music), M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Music, H Meridian-Writing, F Omnibus (documentary), A Sportsworld (live action); **1530** M Music Mix, T UK Top 20, W/F Westway (drama serial), H World of Music; **1545** W UK Album Chart, F Music X-Press.

CHINA RADIO INTERNATIONAL

1500 D News; **1510** S Report on Developing Countries, M-F Current Affairs, A Biz China; **1520** S In the Spotlight (cultural magazine); **1530** M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China, A Listeners' Garden.

RADIO AUSTRALIA

1500 D News; **1505** S Encounter (religion in Australia), M-F Asia Pacific (regional current affairs), A Nocturne (innovative music); **1530** M Health Report, T Law Report, W Religion Report, H Media Report, F The Sports Factor.

RADIO AUSTRIA INTERNATIONAL

1530 D Report from Austria (magazine); **1535** S Network Europe, A Week in Review; **1550** A Listener Letters.

RADIO CANADA INTERNATIONAL

1500 S/A News; **1505** S The Sunday Edition (cont'd. from 1310), A Quirks and Quarks (science).

RADIO NETHERLANDS

1500 S Dutch Horizons, M Research File (science), T Music 52-15 (international music), W Documentary, H/A The Sound Fountain (ideas), F A Good Life (development issues); **1530** S The Sound Fountain, M EuroQuest (Europe in context), T A Good Life, W Dutch Horizons, H Research File, F Documentary, A Roughly Speaking (Euro youth culture).

RADIO FOR PEACE INT'L, COSTA RICA

1500 S Far Right Radio Review (from 1430), M Voices of Our World (Maryknoll program), T Honoring Mother Earth: Indigenous Voices (from 1430), W Living Enrichment Center, H Global Community Forum (from 1430), F A Woman's Voice (from 1430), A Earthspan (War & Peace Foundation); **1530** S World Citizens Weekly Commentary, M Perspective (UN program), T In the Moment, W Peace Forum, H Scope (UN program), F Tropical Conservation Newshour (rainforests), A Newmaier Report; **1545** S/M Hightower Report (commentary), T-A UN Today; **1550** S/M Earthwatch (ecology); **1555** S/M Earth & Sky (astronomy).

WHRI, Indiana

15105 kHz.: **1505** M-F Music (Christian contemporary and gospel). 17650 kHz.: **1505** M-F Music (Christian contemporary and gospel).

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WRMI, Florida
15725 kHz.: **1500** S World Radio Network

1600 UTC/ 12pm E/9am P - Page 50 Freqs

BBC WORLD SERVICE (am)(eu)(eas)

1600 S/A News, M-F Europe Today; **1605** S/A Sportsworld (live action); **1630** M-F World Business Report; **1645** M-F Sports Roundup.

BBC WORLD SERVICE (me)

1600 D News; **1605** S/A Sportsworld (live action), M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Music, H Meridian-Writing, F Omnibus (documentary); **1630** M Music Mix, T UK Top 20, W/F Westway (drama serial), H World of Music; **1645** W UK Album Chart, F Music X-Press.

BBC WORLD SERVICE (wcaf)(esaf)

1600 D News; **1605** S/A Sportsworld (live action), M Meridian-Masterpiece, T Meridian-Screen, W Meridian-Music, H Meridian-Writing, F Omnibus (documentary); **1630** M/F Fast Track (African sport), T The Story of Africa, W Talkabout Africa, H Airbeat.

HCJB, Ecuador

1600 S Message of Truth, M-F Renewing Your Mind, A Words of Hope.

RADIO AUSTRALIA

1600 D News; **1605** S The National Interest (Australian politics), M Margaret Throsby (interview and music), T The Comfort Zone (Australian homes/gardens/food), W Verbatim (oral histories), H Hindsight (Australian history), F AWAYE! (Aboriginal culture), A Nocturne (cont'd. from 1505); **1630** W Earshot (Australian voices).

RADIO NETHERLANDS

1600 S/A News, M-F Newslines; **1605** S Wide Angle (weekly review), A Europe Unzipped (Europe in context).

RADIO FOR PEACE INT'L, COSTA RICA

1600 S Music Medicine, M-F Democracy Now! (Pacifica Radio's daily report), A CounterSpin (media analysis); **1630** A Freespeech Radio News (repeat of Fri. newscast).

WHRI, Indiana

15105 kHz.: **1600** A Sports Spectrum Live; **1605** S-F Music (Christian contemporary and gospel).

WWCR, Tennessee

15685 kHz.: **1600** M-F World Wide Country Radio (country music).

1700 UTC/ 1pm E/10am P - Page 51 Freqs

BBC WORLD SERVICE (eu)

1700 D News; **1701** S Play of the Week (radio theatre); **1705** M-F Outlook (magazine), A From Our Own Correspondent; **1730** A Agenda (trends); **1745** M Patterns of Faith, T What is Civil Society?, W Heart and Soul (religion), H What's the Problem?, F Body and Mind (health).

BBC WORLD SERVICE (me)

1700 S-F News, A World Briefing; **1701** S Play of the Week (radio theatre); **1705** M Health Matters, T Go Digital, W Sports International, H One Planet (ecology), F Discovery (science); **1720** A British News; **1730** M Everywoman, T Focus on Faith, W Pick of the World (best of the BBC), H People and Places, F Essential Guide, A Westway Omnibus (drama serial).

BBC WORLD SERVICE (wcaf)(esaf)

1700 D News; **1705** D Focus on Africa; **1745** D Sports Roundup.

BBC WORLD SERVICE (sas)

1700 S/A World Briefing, M-F News; **1705** M The Hitch-Hiker's Guide to the Galaxy, T The Alternative (music), W Greenfield Collection (classical music requests), H Jazzmatazz, F Composer of the Week; **1720** S/A British News; **1730** S Reporting Religion, M-F Off the Shelf (book readings), A World Business Review; **1745** D Sports Roundup.

RADIO FOR PEACE INT'L, COSTA RICA

1700 S Neumaier Report, M Between the Lines, T A Woman's Voice, W Alternative Radio, H Making Contact (reports & interviews), F Honoring Mother Earth: Indigenous Voices, A TUC Radio; **1715** S Living Enrichment Center; **1730** M TUC Radio, H Steppin' Out of Babylon, A Continent of Media.

SWISS RADIO INTERNATIONAL

1730 S/A Swiss Scene, M-F Newsnet; **1735** A Take 2; **1740** S Culture Zone (the arts-1st/3rd wk) or Out and About (Swiss places-2nd/4th wk), A Sounds Good (Swiss music-3rd/5th wk); **1745** F Business Spotlight.

VOICE OF RUSSIA

1700 D News; **1705** S Music & Musicians, M/H/S Moscow Mailbag, T/F Newmarket, W Science & Engineering; **1730** M-A News in Brief; **1732** M Kaleidoscope, T Yours for the Asking, W Moscow Yesterday & Today, H Russian Musical Portraits of 20th Century, F Folk Box, A Songs from Russia; **1746** T Music At Your Request, A You Write to Moscow; **1754** H Russia: People & Events.

WHRI, Indiana

13760 kHz.: **1730** S Music (Christian contemporary/gospel).

WWCR, Tennessee

15685 kHz.: **1730** T Dialogue.

1800 UTC 2pmE/11am P - Page 51 Freqs

BBC WORLD SERVICE (eu)

1800 S/A World Briefing, M-F News; **1805** T Meridian-Masterpiece, W Meridian-Screen, H Meridian-Music, F Meridian-Writing, A Omnibus (documentary); **1820** S/A British News;

1830 S Assignment, M Music Mix, T UK Top 20, W/F Westway (drama serial), H World of Music, A World Business Review; **1845** W UK Album Chart, F Music X-Press, A Letter from America.

BBC WORLD SERVICE (me)(wcaf)

1800 D World Briefing; **1820** D British News; **1830** S Assignment, M-F World Business Report, A World Business Review; **1845** M/T/H/F Analysis, W From Our Own Correspondent, A Letter from America.

BBC WORLD SERVICE (esaf)

1800 S/A World Briefing, M-F News; **1805** M Health Matters, T Go Digital, W Sports International, H One Planet (ecology), F Discovery (science); **1820** S/A British News; **1830** S Assignment, M Everywoman, T Focus on Faith, W Pick of the World (BBC's best), H People and Places, F Essential Guide, A World Business Review; **1845** A Letter from America.

RADIO KUWAIT

1800 D Program Review; **1802** D Burning of the Oil Wells; **1815** D The Amir Speaks to the Nation for the Nation; **1830** D News; **1845** S-H Musical Interlude, F Pioneers, A Famous Personalities of Kuwait.

RADIO FOR PEACE INT'L, COSTA RICA

1800 S Spiritual Awakening, M-F Freespeech Radio News, A World of Radio; **1830** S One World—One Family (Bahai program), M/W/F Hightower Radio (commentary), T Radio Nation ("The Nation"), H This Way Out (gays magazine), A RFPI Mailbag; **1835** M/W/F Earthwatch (ecology); **1840** M/W/F Earth & Sky (astronomy); **1845** M Tropical Conservation Newsbureau (rainforests), W World Citizen's Weekly Commentary, F Women (UN program).

VOICE OF RUSSIA

1800 D News; **1811** S Sunday Panorama, M-A News & Views; **1824** S Russia: People & Events; **1830** D News in Brief; **1832** S/T This is Russia, M Moscow Yesterday & Today, W Kaleidoscope, H Audio Book Club, F Russian by Radio, A Christian Message from Moscow.

WHRI, Indiana

13760 kHz.: **1800** A DXing with Cumbre.

15105 kHz.: **1800** A World Harvest Country Style; **1805** S Pat Boone, M-F For the People (populist phone-in); **1830** A Live from Studio B.

1900 UTC 3pmE/12pm P - Page 52 Freqs

BBC WORLD SERVICE (eu)

1900 S/A World Briefing, M-F News; **1905** M Health Matters, T Go Digital, W Sports International, H One Planet (ecology), F Discovery (science); **1920** S/A Sports Roundup; **1930** S Science in Action, M Everywoman, T Focus on Faith, W Pick of the World (BBC's best), H People and Places, F Essential Guide, A Westway Omnibus (drama serial).

BBC WORLD SERVICE (me)

1900 S/A News, M-F World Briefing; **1905** S Greenfield Collection (classical music requests), A Jazzmatazz; **1920** M-F Sports Roundup; **1930** S From Our Own Correspondent, M Body and Mind (health), T Patterns of Faith, W What is Civil Society?, H Heart and Soul (religion), F What's the Problem?, A Composer of the Month.

BBC WORLD SERVICE (wcaf)

1900 D News; **1905** S From Our Own Correspondent, M-F Focus on Africa, A Westway Omnibus (drama serial); **1930** S Body and Mind (health), M/F Fast Track (African sport), T Airbeat, W Talkabout Africa, H Postmark Africa, A Greenfield Collection (classical music requests)

BBC WORLD SERVICE (esaf)

1900 S-F News, A World Briefing; **1905** S Wright Around the World (music requests), M-F Focus on Africa; **1920** A Sports Roundup; **1930** M Music Mix, T UK Top 20, W/F Westway (drama serial), H World of Music, A Science in Action.

RADIO KUWAIT

1900 S-H Sounds of Today, F Home Matters, A Kuwait and the Media; **1915** D Songs; **1930** D Sahih Muslim; **1945** S Pell Mell, M Helter Skelter, T Short Stories of Kuwait, W International Top 20, H Pop Session Special, F Discovering Your Hidden Powers, A Scene & Heard.

RADIO FOR PEACE INT'L, COSTA RICA

1900 S Every Living Thing (nature), M Disability Radio Worldwide, T World of Radio, W A Public Affair, H Far Right Radio Review, F Continent of Media, A Making Contact; **1930** M Earthspan (War & Peace Foundation), T RFPI Mailbag, F World of Radio, A Alternative Radio (political/social analysis).

SWISS RADIO INTERNATIONAL

1930 S/A Swiss Scene, M-F Newsnet; **1935** A Take 2; **1740** S Culture Zone (the arts-1st/3rd wk) or Out and About (Swiss places-2nd/4th wk), A Sounds Good (Swiss music-3rd/5th wk); **1945** F Business Spotlight.

VOICE OF NIGERIA

1900 S Youth Forum, M Our Cities, T Our Environment, W Who Are the Nigerians?, H Listeners' Letters, F Nigerian Scene, A Folktales; **1915** H Wheel of Progress, F Business Weekly, A Nigerian Newsletter; **1930** S Window on Abuja, M Perspectives, T African Monarchy, W Theatre on the Air, H Women and Development, F Weekend Magazine, A Time for Highlife; **1945** S From the Bookshelf, T Listeners' Letters.

VOICE OF RUSSIA

1900 D News; **1911** S Music & Musicians, M/H Science & Engineering, T/F Moscow Mailbag, W/A Newmarket; **1930** M-A News in Brief; **1932** M Songs from Russia, T Yours for the Asking, W Musical Portraits of 20th Century, H Folk Box, F Jazz Show, A Russian by Radio; **1946** M Your Write to Moscow, T Music At Your Request; **1954** W Russia: People & Events.

WHRI, Indiana

5745 kHz.: **1905** M-F Music (Christian contemporary/gospel).

9495 kHz.: **1905** M-F For the People (from 1805); **1945** A Music (contemporary Christian/gospel).

WWCR, Tennessee

15685 kHz.: **1930** T New Horizons (science).

2000 UTC 4pmE/1pmP - Page 52 Freqs

BBC WORLD SERVICE (eu)(me)

2000 D Newshour.

BBC WORLD SERVICE (af)

2000 D Newshour; **2050** D Sports Roundup.

RADIO KUWAIT

2000 (all cont'd from 1945) S Pell Mell, M Helter Skelter, T Short Stories of Kuwait, W International Top 20, H Pop Session Special, F Discovering Your Hidden Powers, A Scene & Heard. **2015** D Music; **2030** S-H Kuwait: Land of Prosperity; **2050** D News in Brief.

RADIO FOR PEACE INT'L, COSTA RICA

2000 S New Dimensions, M University Forum (interviews), T Continent of Media, W WINGS (women's news), H Radio Nation ("The Nation"), F RFPI Mailbag, A Alternative Radio (from 1930); **2030** S Far Right Radio Review, T Honoring Mother Earth: Indigenous Voices, W/A University of the Air (peace studies), H Global Community Forum (interviews), F A Woman's Voice.

SWISS RADIO INTERNATIONAL

2000 S/A Swiss Scene, M-F Newsnet; **2005** A Take 2; **1740** S Culture Zone (the arts-1st/3rd wk) or Out and About (Swiss places-2nd/4th wk), A Sounds Good (Swiss music-3rd/5th wk); **2015** F Business Spotlight.

VOICE OF NIGERIA

2000 S News Bulletin, M-F Sixty Minutes, A African Hour; **2015** S Sports Roundup; **2030** S In the News.

Shortwave Guide



WBCQ, Maine
7415 kHz.: **2000** H-S Radio Caroline.

WHRI, Indiana
9495 kHz.: **2005** S Music (Christian contemporary/gospel).

WWCR, Tennessee
9475 kHz.: **2000** F Ask WWCR (letters); **2015** F New Horizons (science); **2030** A Presidential Radio Address/Democratic Response.
15685 kHz.: **2030** H World of Radio.

2100 UTC/ 5pm E/2pm P - Page 53 Freqs

BBC WORLD SERVICE (am)

2100 D News; **2105** S Global Business, M-F World Business Report, A World Business Review; **2120** M-A British News; **2130** D Sports Roundup; **2145** S Reporting Religion, M/T/H/F Analysis, W From Our Own Correspondent, A Letter from America.

[Special service to the Caribbean on 5975/11675/15190 kHz.: 2105 M-F Caribbean Report. Special service to the Falklands on 11680 kHz.: 2130 T/F Colling the Falklands.]

BBC WORLD SERVICE (eu)

2100 D News; **2105** M-F World Business Report, A Jazzmatazz; **2120** M-F British News; **2130** S The Hitch-Hiker's Guide to the Galaxy, M-F Sports Roundup, A Composer of the Month; **2145** M-F Off the Shelf (book readings).

BBC WORLD SERVICE (wca)

2100 D News; **2105** S Wright Around the World (music requests), M Health Matters, T Go Digital, W Sports International, H One Planet (ecology), F Discovery (science), A Science in Action; **2130** M Everywoman, T Focus on Faith, W Pick of the World (BBC's best), H People and Places, F Essential Guide, A People and Politics.

RADIO AUSTRALIA

2100 D News; **2105** F Feedback, A Australia All Over; **2110** S-H AM (morning news magazine); **2130** S Time to Talk (the Pacific region), M Health Report, T Innovations, W Religion Report, H Rural Reporter, F Oz Sounds.

RADIO FOR PEACE INT'L, COSTA RICA

2100 S Voices of Our World (Maryknoll program), M Honoring Mother Earth: Indigenous Voices (from 2030), T Living Enrichment Center, W Global Community Forum (from 2030), H A Woman's Voice (from 0230), F Earthspan (War & Peace Foundation), A Far Right Radio Review (from 2030); **2130** S Perspective (UN program), M In the Moment, T Peace Forum, W Scope (UN program), H Tropical Conservation Newshour (rainforests), F Newmaier Report, A World Citizens Weekly Commentary; **2145** S/A Hightower Report (commentary), M-F UN Today; **2150** S/A Earthwatch (ecology); **2155** S/A Earth & Sky (astronomy).

VOICE OF NIGERIA

2100 S Time for Highlife, M Musical Heritage, T Soul Lift, W Health Corner, H Perspectives, F Our Environment, A Talking Agriculture; **2115** M World of the Arts, T Beyond the Poverty Line; **2130** S Wheel of Progress, M From the Racks, T Ten Seconds, W VON Link-Up, H Our Cities, F Celebrations, A Theatre on the Air; **2145** S Listeners' Letters, M Issues.

WBCQ, Maine

7415 kHz.: **2100** S Radio Free Euphoria, M Jean Shepherd, W The Clone Zone, A HarvZower; **2130** F Pab Sungenig Project.

WHRI, Indiana

5745 kHz.: **2100** S DXing with Cumbre; **2130** S Music (Christian contemporary/gospel).
17650 kHz.: **2130** A DXing with Cumbre.

2200 UTC/ 6pm E/3pm P - Page 54 Freqs

BBC WORLD SERVICE (am)

2200 D The World Today; **2230** S Agenda (trends), F People and Politics, A From Our Own Correspondent.

BBC WORLD SERVICE (wca)

2200 D News; **2205** S The Hitch-Hiker's Guide to the Galaxy, M-F Outlook (magazine), A Omnibus (documentary); **2230** S World of Music, A From Our Own Correspondent; **2245** M Patterns of Faith, T What is Civil Society?, W Heart and Soul (religion), H What's the Problem?, F Body and Mind (health).

RADIO AUSTRALIA

2200 D News; **2205** F Asia Pacific Weekend Edition, A Correspondents Report;

2210 S-H AM (morning news magazine); **2230** A Business Report; **2240** S Australian Music Show (rock), M Music Deli (international), T Blacktracker (Aboriginal contemporary), W Country Style, H Jazz Notes.

RADIO CANADA INTERNATIONAL

2200 S/A The World This Weekend, M-F The World at 6; **2230** S Inside Track (sports anthologies) M-F As It Happens (interviews with newsmakers), A Madly Off in All Directions (comedy).

RADIO FOR PEACE INT'L, COSTA RICA

2200 S Music Medicine, M-F Democracy Now! (Pacifica Radio's daily report), A CounterSpin (media analysis); **2230** A Freespeech Radio News.

RADIO PRAGUE

2230 D News; **2235** S Letter from Prague, M-F Current Affairs, A Readings from Czech Literature; **2245** S The Arts, A Saturday Music (classical/folk/jazz); **2245** S Mailbox, M Spotlight (Czech current events) or One on One (interview), W Czechs in History or Central Europe Today, F Magazine; **2250** T Talking Point, H Economic Report.

RADIO VLAANDEREN INTERNATIONAL

2230 S Radio World, M-F News, A Music from Flanders; **2234** M-F Belgium Today; **2238** S Tourism in Flanders, M-F Press Review; **2243** M Focus on Europe, T Green Society (ecology), W/F Around the Arts, H Economics; **2244** S Brussels 1043 (letters); **2248** M Sports, W Around Town, H International Report, F Tourism in Flanders; **2254** S-F Soundbox (Flemish rock).

WBCQ, Maine

7415 kHz.: **2200** M Wanton Display of Control & Disruption (1st wk.) or The RMF Show (exc. 1st wk.); **2230** F International World Beat Music, A Radio Timtron Worldwide.
9335 kHz.: **2200** S Uncle Ed's Musical Memories.

WHRI, Indiana

5745 kHz.: **2200** S/A Turn Your Radio On.
9495 kHz.: **2205** S-F Music (Christian contemporary/gospel); **2230** A DXing with Cumbre.
7580 kHz.: **2205** M-F For the People (populist phone-in); **2230** S Music (Christian contemporary/gospel).

WRMI, Florida

15725 kHz.: **2200** S Wavescan; **2230** S Viva Miami (magazine).

2300 UTC/ 7pm E/4pm P - Page 54 Freqs

BBC WORLD SERVICE (am)

2300 S The World Today, M-F News, A News Summary; **2301** A Play of the Week (radio theatre); **2305** M-F Outlook (magazine); **2330** S Greenfield Collection (classical music); **2345** M Patterns of Faith, T What is Civil Society?, W Heart & Soul (religion), H What's the Problem?, F Health in Mind.

BBC WORLD SERVICE (eas)

2300 D The World Today; **2330** F Global Business, A Arts in Action.

CHINA RADIO INTERNATIONAL

2300 D News; **2310** S Report on Developing Countries, M-F Current Affairs, A Biz China; **2320** S In the Spotlight (cultural magazine); **2330** M People in the Know (China's leading citizens), T Sports World, W China Horizons (China outside Beijing), H Voices from Other Lands, F Life in China, A Listeners' Garden.

RADIO AUSTRALIA

2300 D News; **2305** F Lingua Franca (about language, A All in the Mind (the brain); **2310** S-H Asia Pacific (regional current affairs); **2320** F Short Story; **2330** S Earthbeat (ecology), M The Buzz (technology issues), T RA Arts, W Rural Reporter, H Media Report, F In Conversation, A Innovations (new products).

RADIO BULGARIA

2300 D News; **2310** S Folk Studio (Bulgarian folk music), M-F Events and Developments (current affairs review), A Views Behind the News; **2320** M Sports; **2325** M-F Timeout for Music; **2330** F Bulgarian Plaza (cultural magazine) or Walks and Talks (interesting places); **2335** M-W, F-A Keyword Bulgaria (Bulgaria and things Bulgarian), H Answering Your Letters; **2345** M Magazine Economy, T Arts and Artists; W History Club, H The Way We Live, F RADIO BULGARIA Calling (for radio hobbyists).

RADIO CANADA INTERNATIONAL

2300 D CBC News; **2305** S Global Village (world music), M-F As It Happens (interviews with newsmakers) [began at 2230], A Quirks & Quarks (science); **2330** W Dispatches (world events through Canadian eyes).

RADIO NETHERLANDS

2330 S/A News; M-F Newslines; **2335** S Sincerely Yours (letters), A Europe Unzipped (Europe in context); **2355** S The Week Ahead (program guide), A Insight (commentary).

RADIO NEW ZEALAND INTERNATIONAL

2300 S-H World and Pacific News, F/A RNZ News; **2310** S-H Sports News, F Saturday Night with John Campbell, A Feature or series; **2315** S-H Pacific Weather; **2317** Kim Hill (interviews/current affairs).

RADIO FOR PEACE INT'L, COSTA RICA

2300 S Neumaier Report, M Between the Lines, T A Woman's Voice, W Alternative Radio, H Making Contact (reports & interviews), F Honoring Mother Earth: Indigenous Voices, A TUC Radio; **2315** S Living Enrichment Center; **2330** M TUC Radio, H Steppin' Out of Babylon, A Continent of Media.

RADIO ROMANIA INTERNATIONAL

2300 D Radio Newswire; **2310** S Focus, M-F Commentary, A The Week; **2315** S Sunday Studio, M Pro Memoria (history), T Business Club, W Society Today, H Cards on the Table (debate) or The Romanian Next to You (interview), F Challenge for the Future or Terra 2001, A World of Culture; **2320** M Political Flash, T European Horizons, A RRI Encyclopedia; **2325** S Romanian by Radio, M/W/F Business Update, T Tourist News, H Listeners' Letterbox, A Roots (culture/traditions); **2330** S Romanian Itineraries, M Pulse of Transition, T Mother Nature (ecology), W Visit Romania, F Practical Guide, A Radio Pictures; **2335** S Listeners' Letterbox, M Performing Arts, T Youth Club, W Partners in a Changing World, F Cultural Survey, A Romanian Itineraries; **2340** M Pages of Romanian Literature, T/H Skylark (folk music), W Stage and Screen, F Spectator (voice of the people), A Bucharest Along the Centuries; **2345** M Romanian Hits, W Romanian Musicians, F Romanian Folk Music At Its Best, A DX Mailbag; **2350** S Romanian Folk Music At Its Best, M Sports Roundup, T Athlete of the Week, W Sports Club, H Football Flash, F Sports Weekend.

SWISS RADIO INTERNATIONAL

2330 S/A Swiss Scene, M-F Newsnet; **2335** A Take 2; 1740 S Culture Zone (the arts-1st/3rd wk) or Out and About (Swiss places-2nd/4th wk), A Sounds Good (Swiss music-3rd/5th wk); **2345** F Business Spotlight.

WBCQ, Maine

7415 kHz.: **2300** S Le Show (humor/entertainment), H Goddess Irina 1 Music Show, F Lost Discs Radio Show, A The Real Amateur Radio Show; **2330** W World of Radio, A Fred Flintstone Music Show.
17495 kHz.: **2300** A Marion's Attic (vintage recordings).

WHRI, Indiana

7580 kHz.: **2302** A 20 The Countdown Magazine (Christian contemporary music charts); **2305** M-F For the People (populist phone-in).

WWCR, Tennessee

5070 kHz.: **2305** T America's Greatest Heroes, W/F Golden Age of Radio Theatre.

Thank You ...

Additional Contributors to This Month's Shortwave Guide:

Harold Frodge, Midland, MI; Michael Murray, UK; Daniel Sampson, Arcadia, WI; Adrian Sainsbury, Radio New Zealand Intl; Harold Sellers, Larry Van Horn, Brasstown, NC; Cumbre DX; DX Listening Digest; Listening In; Hard Core DX; NASWA; World of Radio; Worldwide DX Club.

Seasonal Madness

Just as satellites can fail due to a single component going wrong, it seems that sometimes a problem can rectify itself! NOAA-14 started losing data synchronization last October, caused – judging by the increase in scanner motor current – by bearing drag.

A similar problem had affected NOAA-15 on 10 July 2000, and the lack of synchronization was eventually fixed by an onboard daily re-synch pulse. After much analysis of the housekeeping data from NOAA-14, a similar daily re-synch pulse was implemented. The results were variable; sometimes the data would hold synchronization for some hours, but mostly it failed to hold it and the resulting images were nearly useless. Occasionally though, a period of several minutes' clear image would give encouragement!

The problem apparently corrected itself in the New Year when monitors reported increasing instances of perfect pictures. It was hard to imagine that NOAA had not had a direct hand in this, but Wayne G. Winston, the Direct Read-out Coordinator of the Direct Services Division assured us that, "Concerning the sudden revival of the NOAA-14, nothing particular has been done recently other than the daily re-synch. It has been noted the AVHRR motor current had gone down recently (motor not fighting the probable bearing drag as much), but there is very little we can do from the ground to cure that, especially if (caused by) a lubricant failure. Just happened."

Meanwhile NOAA resumed regular day/night APT channel switching on NOAA-14, and NOAA-15 on 12 February. Channels 2 and 4 are transmitted during daylight portions of each orbit, and channels 3 and 4 on the night portion.

The latest news can be obtained by visiting the NOAA SIS web site:

<http://noaasis.noaa.gov/NOAASIS>

♦ Correspondence

Al Yelvington of Cape May in southern New Jersey sent me an image captured from Meteor 3-5 in mid-January. He comments, "It's a good example of lake effect snow," and pointed out that by the time the NOAA WXSATs were passing, it was too dark to provide much visible-light imagery. The picture was captured using Christian Bock's WXSAT program and then processed using David Taylor's SatSignal.

A close look at Al's image reveals the characteristics of Meteor 3-5's sensors. The elderly

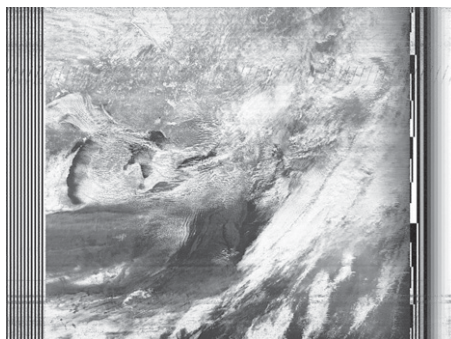


Fig 1: Meteor 3-5 over north America in mid-January from Al Yelvington

spacecraft's images are generally usable, but some individual lines frequently fail to synchronize with the overall image. The sensors themselves are optimized for snow and cloud, so land is usually visible only after image enhancement.

Unlike NOAA WXSATs, Meteor 3-5's orbit slowly precesses, resulting in the WXSAT passing earlier each day, until its orbit eventually passes through the terminator and the Russians switch it off for a few weeks. During this passage, the satellite is in continuous sunlight, but illumination is at a low angle and power is at a premium – hence the power-off.

The seasonal variation also has a dramatic effect. When the WXSAT is operational – as now – but during late winter and early spring, we see it switch off as it crosses into the dark northern polar latitudes. I find it fascinating to watch the change in switch-off time as the WXSAT travels northwards while the northern fringe of twilight slowly permits longer passes.

♦ GOES-E images: seasonal improvement

If you monitor GOES WEFAX transmissions, spring's rapid increase in solar illumination can be seen in the visible-light transmissions from both GOES-E and GOES-W. Whereas mid-winter visible-light GOES images are almost washed out and require enhancement to see significant land detail, by late February the land surrounding the lakes already shows

significant improvement. Figure 2 is an example of such an image, and has had minimal enhancement for publication purposes.

♦ Monitoring becomes essential

It was my wife Marion who said, "Your weather satellite images should help tell us when the concrete can be made." I am setting up an observatory in our back garden in the new home, and not long after receiving the kit pieces (walls and dome), we realized that the company that provided the kit had given us the wrong dimensions for the concrete base. We have to extend the base by several centimeters all round, and the weather has been absolutely atrocious! During two weeks, we had but one day without rain.

Regardless of the forecast, we are using infrared animation images to spot the dry peri-

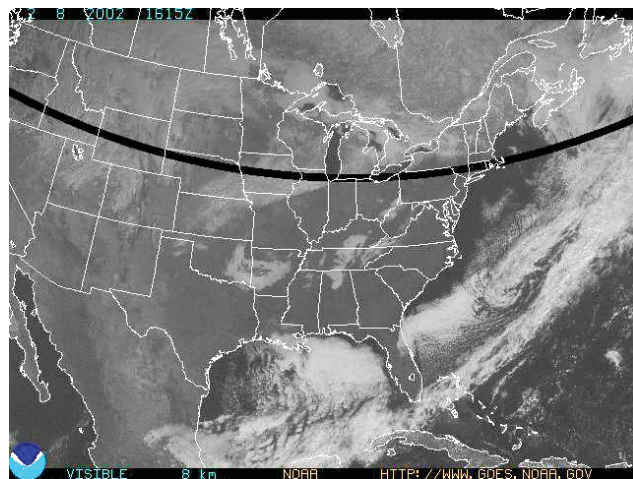


Fig 2: GOES-E visible-light image from 8 February 2002 at 1615UTC

ods between the succession of rain fronts. Maybe this time next month...

Frequencies

NOAA-14 transmits APT on 137.62 MHz
NOAA-12 and -15 transmit APT on 137.50 MHz

Meteor 3-5 may transmit APT on 137.30 MHz when in sunlight

Meteor 2-21 may transmit APT on 137.85 MHz when Meteor 3-5 is off.

GOES-8 and GOES-10 use 1691 MHz for WEFAX



All Frequencies MHz

Satellites Mexicanos

Solidaridad 2

C-Band - 113 degrees West longitude

| | | |
|---------|------|--|
| 1N(V) | 3720 | Data Transmissions |
| 1W/L(H) | 3740 | Data Transmissions |
| 2N(V) | 3760 | Data Transmissions / XEWH-TV Telemex (digital) / Radio Sonora (digital) |
| 1W/U(H) | 3780 | Data Transmissions / TeleMichoacan (digital) / Radio Michoacan (digital) |
| 3N(V) | 3800 | Edusat (digital) |
| 2W/L(H) | 3820 | Data Transmissions |
| 4N(V) | 3840 | Data Transmissions / TV Mas Veracruz (digital) / Radio Mas Veracruz (digital) / Television Tabasqueña (TVT) (digital) / XETVH-AM 1230 Villahermosa (digital) |
| 2W/U(H) | 3860 | Data Transmissions / RGT (digital) / Television Mexiquense (digital) / XEATL-AM 1520 Atlacomulco - Radio Mexiquense (digital) |
| 5N(V) | 3880 | (none) |
| 3W/L(H) | 3900 | Data Transmissions / Canal 9 Oaxaca (digital) / XEOAX-AM 680 Oaxaca (digital) |
| 6N(V) | 3920 | Data Transmissions / XHLQR-TV Canal 7 Quintana Roo (digital) |
| 3W/U(H) | 3940 | Data Transmissions / XHIMT Canal 7 TV Azteca (digital) / XHDF-TV Canal 13 TV Azteca (digital) |
| 7N(H) | 3960 | (none) |
| 4W/L(H) | 3980 | Data Transmissions |
| 8N(V) | 4000 | Data Transmissions |
| 4W/U(H) | 4020 | Data Transmissions |
| 9N(V) | 4040 | MVS Television Empresarial (digital) |
| 5W/L(H) | 4060 | Data Transmissions |
| 10N(V) | 4080 | Data Transmissions |
| 5W/U(H) | 4100 | Data Transmissions |
| 11N(V) | 4120 | (none) |
| 6W/L(U) | 4140 | (none) |
| 12N(V) | 4160 | Data Transmissions |
| 6W/U(H) | 4180 | Data Transmissions / Hidalgo Television (digital) / Radio Hidalgo (digital) / TV Nuevo Leon (digital) / Mexican horse racing (digital) |

Satellites Mexicanos

Solidaridad 2

Ku-Band - 113 degrees West longitude

| | | |
|--------|-------|--------------------|
| T01(H) | 11730 | Sky Mexico DBS |
| T02(H) | 11791 | Sky Mexico DBS |
| T03(H) | 11852 | Sky Mexico DBS |
| T04(H) | 11913 | Sky Mexico DBS |
| T05(H) | 11974 | Data Transmissions |
| T06(H) | 12035 | Sky Mexico DBS |
| T07(H) | 12096 | Sky Mexico DBS |
| T08(H) | 12157 | Sky Mexico DBS |
| T09(V) | 11743 | (none) |
| T10(V) | 11804 | Data Transmissions |
| T11(V) | 11865 | Data Transmissions |
| T12(V) | 11926 | Data Transmissions |

| | | |
|--------|-------|--|
| T13(V) | 11987 | Data Transmissions / Sistema Chiapaneco de TV (digital) / Sistema Chiapaneco de Radio - XHTGU-FM, Tuxtla Gutierrez (digital) |
| T14(V) | 12048 | Data Transmissions |
| T15(V) | 12109 | Data Transmissions |
| T16(V) | 12170 | Data Transmissions |

Satellites Mexicanos SATMEX-5

C-band - 116.8 degrees West longitude

| | | |
|-------|------|---|
| 1(V) | 3720 | Data Transmissions |
| 2(H) | 3740 | Data Transmissions |
| 3(V) | 3760 | Data Transmissions |
| 4(H) | 3780 | Data Transmissions |
| 5(V) | 3800 | (none) |
| 6(H) | 3820 | Data Transmissions |
| 7(V) | 3840 | Data Transmissions / Mexican horse racing (digital) |
| 8(H) | 3860 | Data Transmissions |
| 9(V) | 3880 | Data Transmissions |
| 10(H) | 3900 | Data Transmissions |
| 11(V) | 3920 | Data Transmissions |
| 12(H) | 3940 | Occasional video |
| 13(V) | 3960 | Data Transmissions |
| 14(H) | 3980 | Data Transmissions |
| 15(V) | 4000 | Data Transmissions |
| 16(H) | 4020 | Television Por Cable (PCTV) (digital) |
| 17(V) | 4040 | Data Transmissions / XHAW-TV 12 Monterrey (digital) |
| 18(H) | 4060 | Mexican Government Channel / Mexican "Canal del Congreso" / XEIPN-TV Canal Once, Mexico City / XEIMT-TV Canal 22, Mexico City (digital) |
| 19(V) | 4080 | Data Transmissions |
| 20(H) | 4100 | Data Transmissions / Televisa (digital) |
| 21(V) | 4120 | MVS Television Empresarial (digital) |
| 22(H) | 4140 | Data Transmissions |
| 23(V) | 4160 | Data Transmissions |
| 24(H) | 4180 | Edusat (digital) |

Satellites Mexicanos SATMEX-5

Ku-Band - 116.8 degrees West longitude

| | | |
|-------|-------|---|
| 1(H) | 11720 | Data Transmissions |
| 2(V) | 11740 | (none) |
| 3(H) | 11760 | Data Transmissions |
| 4(V) | 11780 | Data Transmissions |
| 5(H) | 11800 | Data Transmissions |
| 6(V) | 11820 | (none) |
| 7(H) | 11840 | Data Transmissions |
| 8(V) | 11860 | Data Transmissions |
| 9(H) | 11880 | Data Transmissions |
| 10(V) | 11900 | Data Transmissions |
| 11(H) | 11920 | Data Transmissions |
| 12(V) | 11940 | Data Transmissions / Occasional video services (digital) |
| 13(H) | 11960 | Data Transmissions |
| 14(V) | 11980 | Data Transmissions |
| 15(H) | 12000 | Data Transmissions |
| 16(V) | 12020 | Data Transmissions / Occasional video services (digital) |
| 17(H) | 12040 | Data Transmissions |
| 18(V) | 12060 | Data Transmissions |
| 19(H) | 12080 | Data Transmissions / Chinese TV Network (digital) / Tzu Chi (digital) / |

| | | |
|-------|-------|--|
| | | CCTV-4 (digital) / MSTV (digital) |
| 20(V) | 12100 | Data Transmissions |
| 21(H) | 12120 | Data Transmissions |
| 22(V) | 12140 | Data Transmissions |
| 23(H) | 12160 | Data Transmissions |
| 24(V) | 12180 | Data Transmissions / Sistema Tecnológico de Monterrey - Campus Estado de Mexico (digital) / Universidad Virtual Empresarial - Sistema Tecnológico de Monterrey (digital) |

Telesat Canada Anik E1

C-Band - 118.7 degrees West longitude

| | | |
|--------|------|------------------|
| 1A(H) | 3720 | (none) |
| 1B(V) | 3740 | (none) |
| 2A(H) | 3760 | (none) |
| 2B(V) | 3780 | (none) |
| 3A(H) | 3800 | (none) |
| 3B(V) | 3820 | (none) |
| 4A(H) | 3840 | (none) |
| 4B(V) | 3860 | (none) |
| 5A(H) | 3880 | (none) |
| 5B(V) | 3900 | (none) |
| 6A(H) | 3920 | (none) |
| 6B(V) | 3940 | (none) |
| 7A(H) | 3960 | (none) |
| 7B(V) | 3980 | Telesat ID Slate |
| 8A(H) | 4000 | (none) |
| 8B(V) | 4020 | (none) |
| 9A(H) | 4040 | (none) |
| 9B(V) | 4060 | (none) |
| 10A(H) | 4080 | (none) |
| 10B(V) | 4100 | (none) |
| 11A(H) | 4120 | (none) |
| 11B(V) | 4140 | (none) |
| 12A(H) | 4160 | (none) |
| 12B(V) | 4180 | (none) |

Telesat Canada Anik E1

Ku-Band - 118.7 degrees West longitude

| | | |
|--------|-------|---|
| T01(V) | 11717 | KTEL-TV Albuquerque, NM - Telemundo affiliate (digital) |
| T02(V) | 11743 | (none) |
| T03(V) | 11778 | (none) |
| T04(V) | 11804 | (none) |
| T05(V) | 11839 | (none) |
| T06(V) | 11865 | (none) |
| T07(V) | 11900 | (none) |
| T08(V) | 11926 | (none) |
| T09(V) | 11961 | (none) |
| T10(V) | 11987 | (none) |
| T11(V) | 12022 | (none) |
| T12(V) | 12048 | (none) |
| T13(V) | 12083 | (none) |
| T14(V) | 12109 | (none) |
| T15(V) | 12144 | (none) |
| T16(V) | 12170 | (none) |
| T17(H) | 11730 | (none) |
| T18(H) | 11756 | (none) |
| T19(H) | 11791 | (none) |
| T20(H) | 11817 | (none) |
| T21(H) | 11852 | (none) |
| T22(H) | 11878 | (none) |
| T23(H) | 11913 | (none) |
| T24(H) | 11939 | (none) |

| | | |
|--------|-------|---|
| T25(H) | 11974 | KMMF-TV Missoula MT - Fox affiliate (digital) |
| T26(H) | 12000 | Equity Broadcasting Corporation (digital) |
| | | KUTH-TV Logan UT - Pax |
| | | KWBS-TV Eureka Springs AR - Pax |
| | | KWBF-TV Little Rock, AR - WB |
| | | KYPX-TV Little Rock, AR - Pax |
| | | Daystar TV Network |
| | | WPXS-TV St Louis - Pax |
| | | America's Collectibles Network (ACN) |
| | | WBIF-TV Panama City, FL - Pax |
| | | Univision |
| | | KLEC-FM 106.3 Little Rock, AR - "Lick 106.3" |
| | | KHTE-FM 96.5 Little Rock, AR - "Hot 96.5" |
| | | KDRE-FM 101.1 Little Rock, AR - "The River" |
| | | KBBL-AM Cabot, AR - ESPN Radio |

| | | |
|--------|-------|--|
| T27(H) | 12035 | (none) |
| T28(H) | 12061 | (none) |
| T29(H) | 12096 | Hallmark Channel / TVG Network (digital) |
| T30(H) | 12122 | NHK World TV / TV Asia / Oxygen TV (digital) |
| T31(H) | 12157 | (none) |
| T32(H) | 12183 | (none) |

Satellites Mexicanos Morelos 2

C-Band - 120 degrees West longitude

| | | |
|---------|------|--------|
| 1W/L(H) | 3720 | (none) |
| 1N(V) | 3740 | (none) |
| 1W/U(H) | 3760 | (none) |
| 2N(V) | 3780 | (none) |
| 2W/L(H) | 3800 | (none) |
| 3N(V) | 3820 | (none) |
| 2W/U(H) | 3840 | (none) |
| 4N(V) | 3860 | (none) |
| 3W/L(H) | 3880 | (none) |
| 5N(V) | 3900 | (none) |
| 3W/U(H) | 3920 | (none) |
| 6N(V) | 3940 | (none) |
| 4W/L(H) | 3960 | (none) |
| 7N(V) | 3980 | (none) |
| 4W/U(H) | 4000 | (none) |
| 8N(V) | 4020 | (none) |
| 5W/L(H) | 4040 | (none) |
| 9N(V) | 4060 | (none) |
| 5W/U(H) | 4080 | (none) |
| 10N(V) | 4100 | (none) |
| 6W/L(H) | 4120 | (none) |
| 11N(V) | 4140 | (none) |
| 6W/U(H) | 4160 | (none) |
| 12N(V) | 4180 | (none) |

Satellites Mexicanos Morelos 2

Ku-Band - 120 degrees West longitude

| | | |
|---------|-------|--------|
| T01K(H) | 11764 | (none) |
| T02K(H) | 11888 | (none) |
| T03K(H) | 12012 | (none) |
| T04K(H) | 12136 | (none) |

Monitoring the Department of Commerce

Photos courtesy of NOAA/NSSL

Severe weather season is upon us and during this time of year my thoughts turn to the U.S. government department synonymous with weather – the Department of Commerce (DOC).

Commerce is one of my favorite government departments to monitor in the radio spectrum. The wide variety of agencies and missions afford the radio hobbyist lots of opportunity to monitor the departments, not only in the VHF/UHF spectrum but HF as well. So, in this edition of *The Fed Files*, we will explore a few of the organizations that operate under the Commerce Department banner.

◆ Department of Commerce HF Emergency Nets

Like most major government departments, HF frequencies have been set aside for emergency nets in times of disaster. Two Commerce emergency nets have been uncovered and are profiled below.

Net 1 Frequencies: 3222.5 5935.0 6977.5 10493.0 kHz
KDX48 Burlington, NC (National Ocean Survey)
KDX50 Greensboro, NC (Commerce)
KDX51 Washington, DC (Commerce)
KDX54 Silver Spring, MD (National Weather Service)
KDX56 Washington, DC (Commerce)

Net 2 Frequencies: 3363.0 5888.5 8004.0 13558.5 kHz
KAW61 Moses Lake, WA
KAW62 Detroit, MI



NOAA Ship GORDON GUNTER in the Gulf of Mexico

◆ The NOAA Ship Fleet

One of the more coveted targets for intercept by radio hobbyists are the ships of the National Oceanic and Atmospheric Administration (NOAA).

NOAA operates a wide assortment of hydrographic survey, oceanographic research, and fisheries research vessels. These vessels are operated by the Office of Marine and Aviation Operations. Ships located in the Pacific are managed by the Marine Operations Center, Pacific, (MOP) in Seattle, Washington. Ships located in the Atlantic are managed by the Marine Operations Center, Atlantic, (MOA) in Norfolk, Virginia. Logistic support for the vessels is provided by the marine operations centers above, and for vessels home ported in Woods Hole, Charleston, Pascagoula, San Diego, and Honolulu by the Port Captains located in those ports.

The ships are run by a combination of NOAA commissioned officers and wage marine civilians. The wage marine personnel include licensed masters, mates and engineers, and unlicensed members of the engine, steward, and deck departments. In addition, survey and electronic technicians operate and/or maintain the ship's mission, communication, and navigation equipment. The ship's officers and crew provide mission support and assistance to embarked scientists from various NOAA laboratories as well as the academic community. You can get more information of the NOAA fleet at <http://www.moc.noaa.gov/>

| Ship | Hull No | Callsign | Home Port |
|--------------------|---------|----------|-------------------|
| General Calsign | | WCGS | All NOAA Ships |
| Albatross IV | R342 | WMVF | Woods Hole, MA |
| David Starr Jordan | R444 | WTDK | San Diego, CA |
| Delaware II | R445 | KNBD | Woods Hole, MA |
| Ferrel | S493 | WTEC | Charleston, SC |
| Gordon Gunter | R336 | WTEO | Pascagoula, MS |
| John N. Cobb | R552 | WMVC | MOC Seattle, WA |
| Ka'imimoana | R333 | WTEU | Pearl Harbor, HI* |
| McArthur | S330 | WTEJ | MOC Seattle, WA |
| Miller Freeman | R223 | WTDK | MOC Seattle, WA |
| Oregon II | R332 | WTDO | Pascagoula, MS |
| Rainier | S221 | WTEF | MOC Seattle, WA |



Stern view of the DELAWARE II while preparing for trawling operations

| | | | |
|-------------------|------|------|-----------------|
| Ronald H. Brown | R104 | WTEC | Charleston, SC |
| Rude | S590 | WTET | MOC Norfolk, VA |
| Townsend Cromwell | R443 | WTDF | Honolulu, HI |
| Vindicator | | | |

| | | | |
|-----------------------------|------|------|------------------|
| New Ship under construction | | | |
| Whiting | S329 | WTEW | MOC Norfolk, VA* |

* indicates undergoing drydock repairs

◆ NOAA Research Laboratories

The NOAA Research network consists of 12 internal research laboratories and six under-sea research centers. We have profiled some of the major labs' radio systems below.

Air Pollution Studies

Repeater outputs (NFM): 163.275 163.325 164.025 169.025 MHz
Coast Guard Liaison (USB): 2670.0 kHz

Data Collection System Remote Satellite Platforms (DCS): 401.7025
401.7115 401.7130 401.7160 401.7220 401.7235 401.7310
401.7325 401.7355 401.7385 401.7400 401.7445 401.7490
401.7505 401.7655 401.7745 401.7910 401.8060 401.8075
401.8360 401.8390 401.9260 402.0415 402.0445 MHz

Distress, Calling and Safety (USB): 2182.0 kHz

Marine VHF Frequencies (NFM): 156.300 (CH 6) 156.425 (CH 68)
156.450 (CH 9) 156.475 (CH 69) 156.575 (CH 71) 156.600
(CH 12) 156.625 (CH 72) 156.650 (CH13) 156.700 (CH 14)
156.800 (CH 16) 156.925 (CH 78) 157.000 (CH 20) 157.100
(CH22) 157.125 (CH 82) MHz

Meteorological Radiosonde Nationwide (Data): 400.150 MHz

Miscellaneous Assignments: 163.100 166.125 168.350 169.050
169.075 170.200 172.100 408.400 410.425 410.500
410.700 415.850 418.050 418.075 418.575 418.700 MHz

Aeronomy Laboratory

Boulder, Colorado

<http://www.al.noaa.gov/>

Meteorological Channels (Data): 162.025 162.125 MHz

Research and Development Support (NFM): 165.5625 165.6125
171.800 172.050 172.075

Security KMB-807 (NFM): 166.150/164.575 MHz

Atlantic Oceanographic and Meteorological Laboratory (AOML)

Callsign KAG – Miami, Florida

<http://www.aoml.noaa.gov/>

The mission of the Atlantic Oceanographic and Meteorological Laboratory is to conduct a basic and applied research program in oceanography, tropical meteorology, atmospheric and oceanic chemistry, and acoustics. The program seeks to understand the physical characteristics and processes of the ocean and the atmosphere, both separately and as a coupled system.

HF Ship-to-Shore and Intership simplex channels (USB): 2182.0
4146.0 6224.0 8297.0 12356.0 16531.0 16534.0 22159.0
kHz

HF Ship-to-Shore duplex channels (USB): 4429.0/4137.0 4432.0/4140.0 6504.0/6203.0 8752.0/8228.0 13116.0/12269.0 13131.0/12284.0 17275.0/16393.0 17278.0/16396.0 22792.0/22096.0 22798.0/22102.0 kHz
VHF Marine (NFM): 157.125 MHz

National Severe Storms Laboratory (NSSL) KKE 793 – Norman, Oklahoma <http://www.nssl.noaa.gov/>

The National Severe Storms Laboratory is one of NOAA's internationally known research laboratories in investigations of all aspects of severe weather. Headquartered in Norman, Oklahoma, with staff in Colorado, Nevada, Washington, Utah, and Wisconsin, the people of NSSL, in partnership with the National Weather Service, conduct research to improve severe weather warnings and forecasts.

HF Frequencies: 2010.5 4464.0 5769.0 7342.5 10218.5 14380.0 18171.0 23488.0 kHz

Balloon Tracking (Data): 165.4375 MHz

Meteorological Telemetry (Data): 409.975 MHz

Severe Storms Radar Field Studies (NFM): 162.075 162.200 MHz

Storm Chaser Vehicles (NFM): 163.100 168.350 MHz

Severe Storms Studies Aircraft (AM): 122.850 122.90 122.925 MHz

National Marine Fisheries Service (NMFS) <http://www.nmfs.noaa.gov/>

The primary mission of the Office is the protection of the Nation's living marine resources.

The NMFS has its own law enforcement branch to help protection, and manage fishery resources within the 200 mile United States Exclusive Economic Zone (EEZ). NOAA Fisheries headquarters is located in Silver Spring, Maryland, with five regional offices and supporting science centers in the Northeast, Southeast (including the U.S. Caribbean islands), Southwest (including Hawaii and the U.S. Pacific islands), Northwest, and Alaska.

Alaska Admin/Technical Support (USB): 3215.0 3365.0 5907.5 kHz
Alaska Department of Fish and Game Liaison/Air Charter Operations (USB): 2450.0 3230.0 kHz

Coast Guard Liaison (USB): 2670.0 2678.0 kHz

Distress, Calling and Safety (USB): 2182.0 kHz

Law Enforcement, Investigation/Surveillance, nationwide repeater and simplex (NFM): 163.225 165.2375 (Customs liaison) 165.4625 166.050 166.4375 (Customs liaison) 169.075 172.050 MHz

Miscellaneous HF Frequencies Nationwide (USB): 2350.0 kHz

Miscellaneous VHF Frequencies (NFM): 162.050 162.100 163.075 163.100 164.025 165.5875 168.350 172.100 MHz

Narrowband Direct Printing (NBDP): 4204.5 6274.0 8387.5 8398.5 12488.0 12562.0 16694.5 16787.0 22295.5 kHz

National Marine Mammal Center, Seattle, WA (NFM): 163.100 168.350 MHz



The NOAA Ship John N. Cobb

NMFS Aircraft Operations (USB/AM): 3407.0 5562.0 6673.0 8876.0 10015.0 13267.0 17901.0 21937.0 kHz/122.900 MHz

NOAA Ships research and operations [Also NMFS Fishery and oceanographic research vessels] (USB): 2613.0 2616.0 12181.0 kHz

Ship-to-Shore Duplex Government (USB): 4378.0/4086.0 4429.0/4137.0 4432.0/4140.0 6504.0/6203.0 8752.0/8228.0 8800.0/8276.0 13116.0/12269.0 13131.0/12284.0 17275.0/16393.0 17278.0/16396.0 22792.0/22096.0 22798.0/22102.0 kHz

Ship-to-Shore, Simplex Non-Government (USB): 2126.0 2158.0 2166.0 2198.0 2206.0 2366.0 2390.0 2396.0 2406.0 2638.0 2738.0 2832.0 kHz

Ship-to-Shore Simplex/Intership (USB): 4125.0 4146.0 4417.0 6224.0 6227.0 8294.0 8297.0 12353.0 12356.0 12359.0 16528.0 16531.0 16534.0 22159.0 22162.0 22165.0 22168.0 22171.0 kHz

Wildlife Tracking Devices (Data): 165.4375 165.4625 165.4875 165.5125 165.5375 165.5625 165.5875 165.6125 165.6375 165.6625 165.700 166.025 166.050 166.125 166.150 MHz

NMFS Coastal Stations

KAB Seattle, WA
KAC Wood's Hole, MA
KAE Narragansett, RI
KAF Highland, NJ
KAI Galveston, TX
KAW63 Laysan, HI
KBR Beauford, NC
KDX Port Aransas, TX
KHU Long Beach, CA
KHV St. Petersburg Beach, FL
KHW Pascagoula, MS
KMY Gloucester, MA
KWL20 Kodiak, AK
KWL21 Auke Bay, AK
KWL38 Ketchikan, AK
KWL39 Little Port Walter, AK
KWL44 St. Paul Island, AK
KWL48 Honolulu, HI

National Ocean Service (NOS)

<http://www.nos.noaa.gov/>

The National Ocean Service, a part of the National Oceanic and Atmospheric Administration (NOAA), develops the national foundation for coastal and ocean science, management, response, restoration, and navigation. The National Ocean Service Headquarters is located in Silver Spring, Maryland, just north of Washington, D.C.

Aircraft Air-to-Ground (AM): 122.925 MHz

Coast Guard Liaison (USB): 2670.0 kHz

Distress, Calling and Safety (USB): 2182.0 kHz

Florida Keys Marine Sanctuary (NFM): 46.730 49.830 166.075 MHz

Great Lakes Intership (USB): 2003.0 kHz

Great Lakes, non-government duplex (USB): 2514.0/2118.0 2550.0/2158.0 2582.0/2206.0 kHz

Miscellaneous HF Frequencies Nationwide (Digital): 4221.6 4223.0 6334.0 (DCPSK) 6379.5 6392.6 6393.5 6394.0 6394.5 6974.5 8441.0 8502.0 (DCPSK) 8644.1 8645.5 8646.0 9944.5 12676.5 (DCPSK) 12871.5 12894.0 13065.0 16903.5 16905.0 17084.0 17105.0 17175.2 22473.0 kHz

Miscellaneous HF Frequencies Nationwide (USB): 2089.0 2091.0 2350.0 3333.0 3363.0 kHz

Miscellaneous VHF Nationwide (NFM): 34.980 36.220 38.220 40.270 40.290 164.025 164.075 165.4875 166.025 166.150 169.075 170.200 171.800 172.075 MHz

Narrowband Direct Printing (NBDP): 2615.0 4204.5 4210.5 6325.0/6274.0 8427.5/8287.5 8398.5 12590.5/12488.0 12562.0 16818.0/16694.5 16787.0 22387.5/22295.5 kHz

NOAA Research Aircraft (USB): 3416.0 5610.0 6682.0 8882.0



Supercell Thunderstorm- often associated with violent weather.

10093.0 13267.0 21937.0 kHz
NOAA Ships research and operations/Hydro Ops (USB): 2613.0 12181.0 kHz

Ship-to-Shore Duplex Government (USB): 4378.0/4086.0 4429.0/4137.0 4432.0/4140.0 6504.0/6203.0 8752.0/8228.0 8800.0/8276.0 13116.0/12269.0 13131.0/12284.0 17275.0/16393.0 17278.0/16396.0 22792.0/22096.0 22798.0/22102.0 kHz

Ship-to-Shore Simplex/Intership (USB): 4125.0 4146.0 4417.0 6224.0 6227.0 8294.0 8297.0 12353.0 12356.0 12359.0 16528.0 16531.0 16534.0 22159.0 22162.0 22165.0 22168.0 22171.0 kHz

Shore Party Support Operations (USB): 2492.0 kHz

NOS Coastal Stations

KAA San Diego, CA
KAD Kodiak, AK
KVD Bay Saint Louis, MS
KVH Norfolk, VA
KVJ Seattle, WA (Pacific Marine Center)
KVK Miami, FL
KVR Detroit, MI
KVS Seattle, WA
KWX Lewes, DE
WWD La Jolla, CA

That concludes this month's *Fed Files* column. Until next month, 73 and good hunting.



Storm spotting vehicles at the National Severe Storm Lab.

Computer Interfacing Your Scanner

Trunk-tracking scanners are designed to be useful and practical right out of the box, but most users don't take advantage of all the features and capabilities provided by the manufacturer. One increasingly common feature is the ability to connect the scanner to a personal computer. This month we'll take a look at basic computer interfacing with a few popular trunk-tracking scanners.

In the simplest form, a computer interface will save you from having to enter each and every frequency through the keypad. You can put your favorite frequencies in a text file on the computer, convert it into a database, and then transfer it to your scanner. If you'd like to try different bank arrangements or you accidentally lose your scanner settings, you can easily reload them with just a few key-strokes or clicks of the mouse.

In order to take advantage of a computer interface you'll need three things. First, the scanner must have the ability to accept a connection to a computer. A number of scanners come from the factory with a jack or data port already installed. In fact, some radios are controllable only by computer, such as the ICOM PCR-1000 and the Optoelectronics OptoCom. If your radio doesn't have such a connection you may be able to use John Montalbano's PROgramit hardware design to add a remote keypad control. More information about that can be found on John's website at <http://www.qsl.net/ka2pyj/>.

If your scanner already has a computer interface capability then there are only two remaining issues: hardware and software. Hardware is usually in the form of a cable between the scanner and the computer. Some scanners come with a computer cable, while others require you to purchase or build one. The cable attaches to a serial port on the computer, either a 9-pin or 25-pin "D" shell connector on a PC or a multiple-pin DIN connector on a Macintosh. The 9-pin connector

is often referred to as a "DB-9" and the 25-pin version as a "DB-25." Newer computers typically have DB-9 connectors, while older computers and many modems still use DB-25.

Once the proper hardware is in place, all that remains is software. Almost all trunk-tracking scanners that come with computer interfaces have both commercial and non-commercial (either free or low-cost "shareware") programs that exploit the capabilities of the interface. These programs vary in capability from simple command-line frequency transfer utilities to full-blown graphical interfaces for remote operation and control.

◆ Radio Shack PRO-92

The Radio Shack PRO-92 is a handheld trunk-tracking scanner built by GRE that follows Motorola, EDACS and LTR systems. The PRO-92 has a mini-jack labeled "PC/IF" (personal computer interface) on the right side of the radio. The unit comes with a "clone" cable that allows the programming from one PRO-92 to be transferred into another. The cable itself has a 1/8-inch mono phone plug on each end, so an adapter is needed to attach it to the DB-9 or DB-25 connector on a PC.

Technically speaking, the PRO-92 does not allow full computer control. The interface is limited to uploading and downloading memory settings, as well as some radio parameters such as rescan time and back-light duration. Unfortunately, you cannot use the interface to, for instance, tune to a specific frequency or check the current signal strength as you can with some other scanners.

GRE sells a package for the PRO-92 called *Scanner Data Manager* that includes computer software and a PC interface cable. It works by emulating the clone mode of a second PRO-92 and allows you to transfer frequencies into the scanner from your Windows-based PC. The package is available

from Radio Shack on-line at <http://www.radioshack.com> or via their 1-800-THE-SHACK number as catalog number 940-1223, and it retails for \$69.99. Finding an in-store sales clerk that is able to identify and order the proper item seems to vary from store to store. My local Radio Shack store happens to have at least one knowledgeable and experienced sales person, but not every store is so well staffed.

There are also third parties producing PRO-92 cables, which come in two different types. The first is a one-way cable that allows you to download frequencies into the scanner. The other is a two-way cable that will allow both downloading into the scanner and uploading from the scanner. If you're handy with a soldering iron there are several different plans and schematics on the Internet that will instruct you on how to build your own.

Several free programs are available on the Internet that provide the ability to quickly upload and download frequency banks, change the weather (WX) channels to user-selected frequencies, and even set the back-light timeout. Versions of these programs run under DOS, Windows, and Linux. The source code for many of these programs is also available.

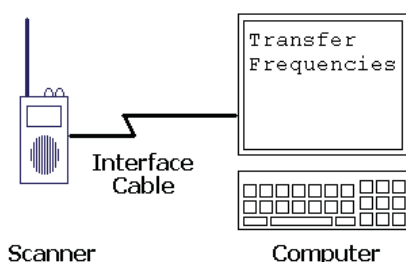
◆ Radio Shack PRO-93

The Radio Shack PRO-93 is a new handheld scanner built by GRE that follows Motorola and EDACS systems. I've been informed that the interface cables for the PRO-92 also work with the PRO-93 but the software does not. The PRO-93 *Owner's Manual* indicates that the cloning cable is not supplied but that there is an "optional PC interface kit" that will allow transfer of frequency information to and from a PC.

◆ Uniden BC 245XLT

The Bearcat BC 245XLT is a handheld scanner built by Uniden that follows Motorola and EDACS systems. It's been out for nearly three years now and comes with a full computer control capability.

When the 245XLT was introduced, Uniden decided not to reveal the details regarding the format and meaning of the messages and instructions used by the computer interface, presumably to prevent other companies from writing software for the radio. However, just like the "secret" protocol used



by the ICOM PCR-1000, many people managed to work out the messages and instructions by eavesdropping on the serial communication between the scanner and a computer running manufacturer-approved software. This process of "reverse engineering" the protocol resulted in a list of known commands and soon afterward a series of third-party software programs started to appear. As it turns out, the 245XLT uses a protocol very similar to the earlier base station scanner model 895XLT, so many programs will work on both radios.

The 245XLT has a "remote" jack located on the right side of the radio, covered by a rubber flap. The cable that comes with the scanner plugs into this jack and connects to either a personal computer, an



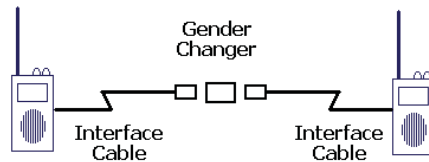
external modem, or another cable, depending on the kind of connection mode you want.

The *Smartscan Mode* is a way for users to have their scanner frequencies programmed in directly from Uniden. The user connects the scanner to a modem, enters the local ZIP code, and has the modem dial a 900 number. Once connected, the modem delivers frequency information to the 245XLT from Uniden's National Frequency Database server.

In order to connect the scanner directly to a modem, a small device called a *null modem adapter* is needed between the modem and the cable. This device rearranges the signals from one side to the other and allows the scanner to communicate properly with the modem. These adapters are available from retail computer and electronics stores.

In *Clone Mode* two 245XLTs are connected together to transfer frequencies from one to another. This setup will require a null modem adapter and possibly another device called a *gender changer* to allow the cables to mate together properly. The cable that

comes with the scanner is referred to as a female DB-9, meaning the 9 wires end up as holes at the edge of the connector rather than as pins as they do on the male DB-9. Since most null modem adapters have a male connector on one end and a female adapter on the other end, without the gender changer you'll end up with two female DB-9s and no way to connect them.



BC 245XLT Cloning

For the *Remote (PC Control) Mode* you simply connect the scanner cable straight into an available serial port on the back of the computer. Older PCs may have a 25-pin connector, in which case a 9-to-25-pin adapter from a computer or electronics store will do the trick.

Many commercial software packages support the 245XLT, as you can see from the advertisements here in *Monitoring Times*. Non-commercial software programs are also available on the Internet.

One interesting application is sharing frequency files. Doug Fisher operates a "scanning files website" at <http://home.earthlink.net/~dougfisher/scanner.html> where 245XLT owners can share their frequency lists with others. Using a simple backup utility, the contents of the scanner's frequency banks are copied into a computer file and then uploaded to Doug's website. Other owners can then download the file and transfer it into their scanner. The site currently appears to be focused on various automobile racing frequency sets.

Uniden BC 780XLT

The Bearcat BC 780XLT is a mobile/base trunk-tracking scanner built by Uniden that follows Motorola, EDACS and LTR. The radio has a standard DB-9 connector on the back, so any regular serial cable with the proper connectors should work. The protocol used on the computer interface is very similar to the 245XLT (the protocol differences between the 895XLT, 245XLT and the 780XLT seem to be mostly related to hardware features of the different radios) and there are a number of software programs available from commercial and non-commercial sources.

Besides the usual Windows applications, there is a UNIX software package at <http://freshmeat.net/projects/780xlt-display/> that provides basic radio controls and displays frequency, talkgroup and current signal strength through a simple X-11 graphical interface.

For a more portable interface there are several programs for the Palm Pilot series of Personal Digital Assistants (PDA) that allow

remote control of many scanner functions.

A somewhat more unusual application for computer control of the 780XLT is a poor-man's spectrum analyzer. Since a computer can instruct the scanner to tune to a specific frequency and report the signal strength, it is possible to write a software program to quickly tune in small increments from a starting frequency to an ending frequency and plot the signal strength on the computer screen. This gives a graphical representation of the radio activity occurring between the starting and ending frequencies.

Encrypting EDACS

The attacks of September 11, 2001, have given a new argument to those agencies that want to prevent scanner listeners from hearing public safety communications, and radio system manufacturers are responding.

M/A-Com, the current provider of EDACS systems, has announced a product called the EDACS Security Key (ESK). This optional system feature encrypts the data messages sent on the control channel, shutting out radios and trunk-tracking scanners that do not have the proper decryption key. Agencies will have to shell out \$15,000 for the administrative software and \$100 per radio to make use of ESK.

ESK is scheduled to become available this summer for both EDACS and ProVoice systems.

That's all for this month. I welcome your electronic mail about computer interfaces or any other radio topic at dan@signalharbor.com, and as always more information is available on my website at <http://www.signalharbor.com>. Until next month, happy monitoring!

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Reviewing the Basics

Welcome aboard everyone! For our main feature, we are going back to review some basic facts in regard to our hobby. The better these are understood, the easier it will be for us to understand what we are hearing – experienced folks as well as newcomers!

First though, we want to announce that the second version of ATCC (the most realistic Air Traffic Control simulation available) should be available in about four months. Xavius Software, the company that has it in production, tells me they're tweaking a few things and refining the total package. As soon as they're satisfied, it will go gold. Look for an announcement here in the column. I have had version 1.1 for three years and can't get enough of it! I also know quite a few air traffic controllers who are big fans of this program.

For our review, we'll start out with navigation aids (navaids) and then go to air traffic control (ATC). This will be continued in future columns.

◆ Navigation Aids

NDBs (Non-Directional Radio Beacons): An NDB is a radio signal intended for use in airborne radio direction finding instrument approaches. It's also an aid to a more precise holding pattern where holding is required. NDBs are generally installed at or near airports to aid pilots in finding the airport. Most nondirectional radio beacons operate in the low or medium wave band and have a frequency range of 190 to 535 kHz. They radiate a circular or nondirectional signal pattern, permitting reception from any point within the facility's range.

Depending on the facility, some NDBs are capable of voice transmission. Those which are not will have a "W" included in the class designator, and on aeronautical charts the frequency is underlined to show no voice capabilities. All class HH, H, and MH NDBs transmit a continuous 3-letter identifier in slow Morse code, except during voice transmission. (Incidentally, this is a good way to learn code – even for old gals like yours truly!)

TACAN (Tactical Air Navigation): TACAN is a navigational system which was originally developed by the military to more readily lend itself to military requirements. It is an UHF Omni-directional radio range, which provides continuous, accurate, slant-range distances and directional information.

Most TACANs are now integrated with the civil VOR/DME program.

Distance Measuring Equipment (DME): The DME is not a separate navaid. It is equipment used in conjunction with a VOR, TACAN, VORTAC, and ILS (Instrument Landing System). The DME operates in the ultra-high frequency range from 962 to 1213 MHz with a maximum range of 300 nm (nautical miles). This range gives 252 frequencies which are paired to provide 126 "channels." Each channel consists of two frequencies space 63 MHz apart, one for air-to-ground interrogation, and the other for ground-to-air response. The use of different frequencies prevents the airborne interrogator accepting signals received from its own transmissions bounced back from the ground.

DME equipment offers many advantages to both pilot and air traffic controller. With it, the pilot has range from a DME-equipped station displayed instantly, accurately and constantly, along with the directional information from the facility.

Radio equipment on the aircraft, known as the airborne interrogator, sends out a stream of coded pulses of radio energy. When a pulse reaches a ground station, known as the ground transponder, it triggers off the transmitter which sends out a reply pulse to the receiver of the airborne interrogator. The time interval between transmission of the pulse and reception of the reply pulse is measured electronically, and the range of the beacon is automatically computed and displayed. Reliable signals may be received at distances up to 199 nm at the line of sight altitude with an accuracy of better than 1/2 mile or 3 percent of the distance, whichever is greater.

DME aids the controller by making a greater portion of his airspace usable. DME-equipped aircraft can hold at any point within reception range of a DME-equipped facility, and are not limited to intersections or radio fixes based on two facilities, thus aiding in reducing general airway and terminal area congestion. Distance information received from DME equipment is *slant range distance* and not actual horizontal distance. DME measures the slant difference from the aircraft to the beacon, which is only slightly longer than the ground distance.

Incidentally, the frequency of the DME is automatically tuned when the frequency of a VORTAC is dialed, and the distance to go appears when the facility is within range. A

VOR paired with a DME consists of a DME transponder located at a facility, and the UHF DME frequency is paired to the VHF VORTAC frequency.

VOR (VHF Omnidirectional Range): The Pilot/Controller Glossary (FAA) defines VOR as follows: "A ground-based electronic navigation aid transmitting very high frequency navigation signals, 360 degrees in azimuth, oriented from magnetic north. Used as the basis for navigation in the National Airspace System. The VOR periodically identifies itself by Morse Code and may have an additional voice identification feature. Voice features may be used by ATC or FSS for transmitting instructions/information to pilots." In addition, they may include weather broadcasts.

An example of a voice VOR identification would be: "Tinytown VOR," alternating with its Morse Code ID.

As the name suggests, VORs transmit in the VHF (Very High Frequency) band from 108 through 117.975 MHz. The range is limited to line-of-sight, which is normally 200 miles.

Identification is transmitted continuously except when interrupted by an actual voice transmission on the voice feature of the navaid, or during periods of maintenance, in which case the identification of the facility is removed. VORs without voice capability are identified by the letter "W" included in the class designator – e.g., VOR-W.

VORTAC: A navigation aid providing three individual services – VOR azimuth, TACAN azimuth, and TACAN distance measuring equipment (DME) – all at one site. A VORTAC provides bearing information on VHF (108 – 117.975 MHz). Frequency assignments between 108.0 and 112.0 are in the even 10th decimal to preclude any conflict with an ILS localizer frequency assignment, as well as bearing (azimuth) and range information on UHF (960 – 1215 MHz).

Transmitted signals of VOR and TACAN are each identified by three-letter code transmissions and are interlocked so that pilots using VOR Azimuth with TACAN DME can be assured that both signals being received are definitely from the same ground station. The frequency channels of the VOR and the TACAN at each VORTAC facility are paired in accordance with a national plan to simplify airborne operation. Aircraft receiving

equipment which provides for automatic DME assures reception of azimuth and distance information from a common source whenever designated VOR/DME, VORTAC, ILS/DME, and Localizer/DME are selected.

One of the major functions of all VORTACs and VORs is on airways giving center line guidance and indicating reporting points. Aircraft equipped with VOR/DME use the bearing information from a VORTAC and obtain range information from the TACAN portion. TACAN-equipped aircraft can receive both bearing and range information from the TACAN portion.

A common question is "How do all these Nav aids work together in a VORTAC?" Here's how it goes: VORTAC/DME, VOR, ILS/DME and Localizer/DME facilities are identified by synchronized identifications which are transmitted on a time-share basis. The VOR or Localizer portion of the facility is identified by a coded tone modulated at 1020 Hz or by a combination of code and voice. The TACAN or DME is identified by a coded tone modulated at 1350 Hz. The DME or the TACAN coded ID is transmitted one time for each three or four times that the VOR or Localizer coded ID is transmitted. Then, if either the VOR or the DME is inoperative, it is important to recognize which identifier is retained for the operative facility. A single coded ID with a repetition interval of approximately 30 seconds indicates that the DME is operative.

If anyone has questions regarding further operation of these navigation aids, please let me know via either email or snailmail, and I'll be happy to discuss these in more detail.

◆ Separation and Air Traffic Control

If an air traffic controller's prime responsibility were to be described as simply as possible, it would be "keeping aircraft separated." Let's define this a bit more concisely.

First, let's define separation in regard to airspace. Vertical separation is separation of aircraft at different altitudes. Longitudinal is the separation of aircraft following one another in trail. Lateral separation concerns separation of aircraft at the same altitude, most often to the left or right side. Given today's use of radar, separation could be thought of basically as either vertical or horizontal.

Vertical Separation: Vertical separation between instrument flight rules (IFR) aircraft is 1000 feet up to and including FL (flight level) 290 (which means 29,000 feet in controller vernacular). Above FL 290, vertical separation is 2,000 feet.

To provide 2,000 feet of vertical separation above 290, only odd numbered altitudes are used. Aircraft at the higher altitudes, flying on courses of 360 to 179 degrees, fly at FL 330, 370, 410, etc. Those flying courses of 180 to 359 degrees use 310, 350, 390, etc.

According to Federal Aviation Regulations, visual flight rules (VFR) aircraft fly at the given altitude plus 500 feet. For example,

they use 10,500, 11,500, and 12,000 feet. Incidentally, altitude is measured in feet up to 18,000. After that, it's called flight levels.

The 2,000-foot separation minimum above FL 290 is based (among other things) on altimeter accuracy problems at those altitudes. During the past decade, an extensive study on altimeter accuracy has investigated the possibility of moving to 1,000. The study is still ongoing.

Longitudinal Separation: In today's environment, most aircraft are separated by three nautical miles in terminal areas, and five nautical miles when under control of an ARTCC. But again, separation criteria are not always that simple.

Wake turbulence separation minima. Wake turbulence is a violent disturbance of the air behind an aircraft, resembling a pair of horizontal tornadoes. The bigger and heavier the aircraft, the more violent the disturbance. For wake turbulence purposes, aircraft are divided into three categories, Heavy, Large, and Small. For instance, an MD-11 is a heavy aircraft, a 727 is a large aircraft, and a Cessna 421 is a small aircraft. Although a 757 is not considered a heavy aircraft per se, it is given that designation for separation purposes.

For aircraft flying directly behind and less than 1,000 feet below a preceding aircraft, the following separation minima apply:

- **Heavy behind a heavy – four nautical miles.**
- **Small or large behind a heavy – five nautical miles**
- **Near the runway when the preceding aircraft is over the landing threshold:**
 - **Small behind a large – four nautical miles.**
 - **Small behind a heavy – six nautical miles**

Lateral Separation: Lateral separation exists for non-intersecting flight paths under the following conditions:

- **When the required distance is maintained between the flight paths.**
- **When reduced route-protected airspace is applicable and the protected airspace of the flight paths do not overlap.**
- **When aircraft are crossing an oceanic boundary and are entering an airspace with a larger lateral minimum than the airspace being exited.**

Lateral separation is also applied to aircraft whose flight paths are intersecting, using a formula which keeps them safely separated.

The Snitch Gear: Separation also leads us into the next subject under discussion – the OEDP (Operational Error Detection Patch). This is also known as "Sally Snitch," the "Snitch Gear," "Squeal A Deal"* – as well as other names not suited for a family-type magazine. The OEDP blows the whistle when a controller has lost the required minimum separation between two aircraft. In essence, it is the automatic detection of an operational error.



Separation anxiety at Hartsfield International. Photo credit, Rachel Baughn

When the OEDP first became operational, the number of reported errors increased significantly because the program was capable of detecting 4.9 mile separation errors when the stated requirement is 5 miles. Controllers could not discern the one-tenth-of-a-mile loss of separation with the naked eye, so they became conservative, increasing the usual separation to seven miles. The OEDP is used in both the ARTCC and the Tower/TRACON environments.

Initially, the controllers did not greet the OEDP with a great deal of enthusiasm. But now they have grown used to it and the system is accommodating slightly increased distance between aircraft, most everyone agrees that the "snitch gear" has made the system safer – and reduced separation anxiety!

That's it for April. No fooling though, if we've been able to answer some questions that may have been puzzling you, it's made our day.

* *A "deal" is controller talk for an incident - whether it's a near miss or an actual collision, on the ground or in the air.*

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DX Software

A quick look at any copy of *MT* will find advertisements for a wide variety of software – software for decoding shortwave data communications, for controlling scanners, for designing antennas, for predicting shortwave propagation. There are programs specifically for AM DXers, too.

Version 2.0 of Neil Adams' *FCC Database Reader* is now out. As the name suggests, this inexpensive program provides a user-friendly interface to the official FCC engineering database. You get a list of the stations on a selected frequency, plus all kinds of technical information. Maybe most valuable for DXing are the power and the directional antenna pattern.

Knowing the antenna pattern is very valuable to the DXer. Consider, for example, DXing from my hometown of Madison, Wisconsin. There are two 50,000-watt stations in the Minneapolis-St. Paul area, 230 miles away. One of them, WCCO-830, blasts into Madison every night. The other, KSTP-1500, is much rarer; a logging of KSTP in Madison is fairly good DX – even though KSTP's transmitter is actually 18 miles closer to Madison. Why is that?

A quick look at the two stations' records in the *Database Reader* shows why. WCCO is non-directional, spreading its 50,000 watts equally well in all directions. KSTP, however, uses a highly directional antenna at night. The radiated power in the direction of Madison is rather small – maybe a few hundred watts. No wonder KSTP is so hard to hear: The directional antenna makes 1500 a very "DX-able" frequency in Madison, far more so than 830.

There's another valuable tab in the *Database Reader*. The "Sun" tab shows the real and monthly average sunset and sunrise times. The monthly averages are the times that stations are required to switch to and from their nighttime antenna pattern and power. KSTP's average sunset time for March is 6:15pm Central time; that's the time when they begin using the directional antenna. If you're trying to catch KSTP from somewhere to the east of the Twin Cities, it might be best to listen just before this time. Night is approaching (the propagation is improving), but the station is still broadcasting on its non-directional daytime facilities.

One more interesting feature is the ability to sort the stations on a frequency by the predicted signal strength. You can predict what stations should be loudest at a particular location and time; WSUI Iowa City should be the dominant signal in Madison on 910 kHz. Of course, Mother Nature might have other plans.

FCC Database Reader is on <http://>

home.earthlink.net/~nsadams/ There's a free trial available.

Speaking of software and DXing, I've written a little package of my own. *AutoDX 2* is a program for automatically recording top-of-the-hour identification announcements. At 30 seconds before the hour, it launches Windows Sound Recorder. It records for one minute, then saves the file with a unique name showing the time and date of the recording. The idea is to allow your computer to DX while you're sleeping (or at work); you can come back and review the recordings later and see if there's anything new.

I am by no means a professional programmer! *AutoDX* is known to crash at midnight and I can't guarantee it'll work perfectly. It has, however, added some interesting things to my log. In my not particularly humble opinion, it's worth trying. Look at <http://www.w9wi.com/software>, and be sure to read the "readme-autodx.txt" file first. *AutoDX* is free software.

Mailbag

- Country music will live on WSM-650. Last month I reported substantial rumors that the legendary station would switch to an all-sports format. Station management has since announced the station will keep its traditional country format, at least for the time being. Other changes, however, might be expected. WSM-AM is by far the least listened-to of Gaylord Entertainment's three Nashville stations, and it's far behind all its FM country competitors.
- Only a very lucky few DXers have heard the Virgin Islands on AM. That, however, has changed with the most recent new expanded-band station. WDHP-1620 has signed on the air from Frederiksted, and it's being heard throughout the eastern half of the country. WDHP carries a wide variety of programming, including some in Spanish. It operates in parallel with WRR-1290 and WAXJ-FM 103.5, and identifies as "The Reef." If you aren't too close to powerhouses WTAU-1620 (Texas) and WDND-1620 (Indiana), you stand a good chance of hearing an interesting new radio country. Listen for music and a Caribbean-accented announcer.
- Speaking of WSM-650, Patrick Griffith near Denver spent some time staking out their channel, and was rewarded with two

new loggings. Early on the morning of January 4, WSM had faded out, replaced by previously-heard CKOM Saskatoon, Saskatchewan. A half-hour later, KMTI Manti, Utah, suddenly appeared out of nowhere with news. KMTI only lasted for two minutes before suddenly disappearing. Patrick speculates they switched from their 900-watt night power to their 10,000-watt day power for a few minutes.

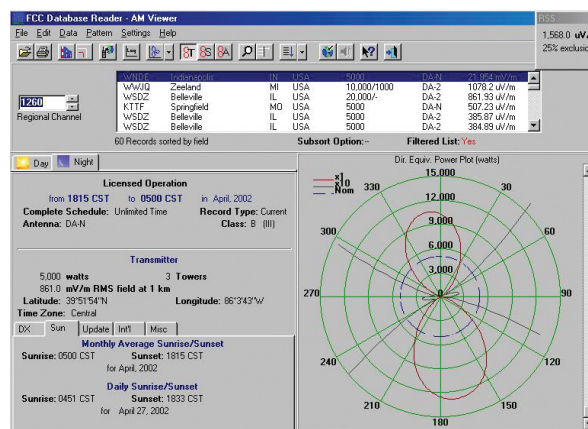
Later that night, he turned the radio back on, still tuned to 650. This time, another new-to-the-log station appeared. WNMT-650 is in Nashwauk, Minnesota, on the Iron Range north of Minneapolis. Patrick uses a Drake R-8 and Kiwa loop antenna.

I hope to have logged WDHP-1620 by the time you read this. Have you? Write me at 7540 Hwy 64 West, Brasstown, NC 28902-0098, or by email to w9wi@w9wi.com. Good DX!

LOGGINGS

I've logged over 80 stations so far with my "AutoDX" software. The better catches from Nashville, TN:

| | |
|-----------|---------------------------|
| KIJN-1060 | Farwell, Texas |
| KAAB-1130 | Batesville, Arkansas |
| WSDX-1130 | Brazil, Indiana |
| KSL-1160 | Salt Lake City, Utah |
| KGIR-1220 | Cape Girardeau, Missouri |
| WDSK-1410 | Cleveland, Mississippi |
| KKPR-1460 | Kearney, Nebraska |
| KOLM-1520 | Rochester, Minnesota |
| WCGO-1600 | Chicago Heights, Illinois |



Nighttime directional antenna pattern for WNDE-1260, Indianapolis.

Finding Pirate and Clandestine DX Information

The unlicensed pirate and clandestine radio scene on shortwave radio is constantly changing. Updated information is always necessary if you are trying to hear the stations. Every month we cover fresh loggings here in *Monitoring Times*, but other resources are also very useful. If you're DXing political clandestine stations, Martin Schoech's *Clandestine Radio Watch* and Nick Grace's clandestine radio dot com are invaluable. Nick is frequently interviewed by international media, and governments across the world check Martin and Nick's <http://www.clandestineradio.com> regularly. You should, too.

When it comes to North American pirates, three sources still dominate the field. The outstanding *Free Radio Network* web site at <http://www.frn.net/> on your internet dial is, of course, free. *Free Radio Weekly*, a valuable free newsletter e-mailed each week, can be reached through niel@ican.net if you'd like to try them. *The ACE*, with a 20 year history, is the only North American radio club devoted exclusively to unlicensed broadcasting. Sample copies are \$2.00 via PO Box 1, Belfast, NY 14711.

◆ What We Are Hearing

North American pirate stations all operate near 6955 kHz, but frequencies can vary. A handful of stations use nearby frequencies such as 6900 or 6925 kHz. Our readers heard all of these broadcasters this month:

Buckwheat Radio- Buckey has been using 5 watts lately, but his signal gets out. He promises QSLs soon. (Uses buckwheatradio@hotmail.com e-mail)

CHE-FM- So far it's unclear if this is a pirate imitation of a licensed station or a relay of a licensed station. Does anybody know? (None)

Crunch Radio- The oldies on this one are normally over 50 years old. They claim to broadcast in hi-fi, and their audio is quite good. (None)

Lubavitcher Radio- If you live near Ontario you might want to check 1710 kHz for this religious medium wave pirate. (None)

Oxycontin Radio- Their format varies from rock to ancient 1940's pop, sometimes mixed with drug advocacy. (None)

Psyco Radio- This one has been extremely active with complex sketches and rock music. (Uses psycoradiohd@yahoo.com e-mail, but rarely replies)

Radio Free Euphoria- Captain Ganja is back with another year of funny programming.

He'll never be named the Drug Czar by the government, even though he knows the product. (Belfast)

Radio Free Speech- Bill O. Rights has opened up access to his transmitter. Many of his shows are now relays of other pirates in AM mode, identified as the Radio Free Speech Relay Service. (Belfast)

Radio Neptune- Unlike the BBC Service for the World outside North America, Radio Neptune's "Universal Service" is beamed everywhere. (Blue Ridge Summit)

Radio Piraña International- Various South American pirates have showed up a couple of times a month on 11420 kHz, usually an hour or two before sunset. (Santiago)

Radio Three- Sal Amoniac has been using guest announcers from other pirates lately, but he normally programs rock and comedy. (None, requests logs in *The ACE*)

RBCN- Radio Bob is back with his communications network and originally produced skits. (Lula)

Rizzo Radio- Philadelphia's former mayor will not be forgotten, but he played Christmas music around Ground Hog Day. (Uses rizzoradio@yahoo.com e-mail)

United Patriot Radio- Steve Anderson's right wing clandestine station is still gone, but the federal Bureau of Alcohol, Tobacco, and Firearms raised the reward for his capture from \$5,000 to \$20,000. (Obviously none)

URGZ- This veteran rock music pirate has returned. In the past they gave a phonetic call letter ID of "urges." (Belfast)

Voice of Captain Ron Shortwave- Captain Ron's approach to rock is twofold. Sometimes he plays the tunes, and sometimes he sings along. (Uses captainronswr@yahoo.com e-mail)

Voice of Laryngitis- Recent replays of Gengis and Stanley Huxley's old shows are a delight. Many think that this was the best produced pirate in history. (Belfast)

Voice of the Angry Bastard- Their program content leans toward standard rock and blues, despite the vicious name. (Belfast)

The Crooked Man- This one is pirate radio's tribute to insane stream of consciousness performance art. The announcer claims to have injured his head during a fall from the Hindenberg. (None currently valid)

WHYP- The James Brownyard Memorial station covers the pirate radio scene from North East, PA. (Providence)

WJFK- The station traditionally broadcasts

annually on November 22. This year, few (if any) DXers heard them, but they sent out the QSL we see here anyway! (Looks for logs in bulletins)

WMFQ- Their call letters stand for Where's My QSL?

We left out a letter; you figure it out. (Providence)

WRAF- This new one claims to be "Radio Al Fansome" from the Stalinist Shortwave Network in solidarity with the Rodent Revolution and Commander Bunny of WBNY. (None)

WRAY- This oldies rocker has announced a recent change in their maildrop. (Belfast)

Z-100- If you hear professionally produced rock that reminds you of metro FM stations, you probably are tuned to the big Z. (Uses bigz100fm@yahoo.com e-mail)

◆ QSLing Pirates

Reception reports to pirate stations require three first class stamps for USA maildrops or \$2 US to foreign locations. The cash defrays postage for mail forwarding and a souvenir QSL to your mailbox. Letters go to these addresses: PO Box 1, Belfast, NY 14711; PO Box 28413, Providence, RI 02908; PO Box 109; Blue Ridge Summit, PA 17214; PO Box 24, Lula, GA 30554; and PO Box 159, Santiago 14, Chile. Some pirates prefer e-mail, bulletin logs or internet web site reports instead of snail mail correspondence.

◆ Thanks

Your loggings and news are always welcome via PO Box 98, Brasstown, NC 28902, or via the e-mail address atop the column. We thank this month's contributors: Ralph Brandi, Tinton Falls, NJ; John Calabro, Melrose, MA; Jerry Coatsworth, Merlin, Ontario; Ross Comeau, Andover, MA; Ed Cummings, Harold Frodge, Midland, MI; William Hassig, Mount Prospect, IL; Vince Havrilko, APO Korea; Harry Helms, Ridgecrest, CA; Chris Lobdell, Stoneham, MA; Greg Majewski, Oakdale, CT; Bill McClintock, Minneapolis, MN; Larry Nimmons, Greenville, SC; Lee Reynolds, Lempster, NH; Robert Ross, London, Ontario; Martin Schoech, Merseburg, Germany; Tom Severt, Frontenac, KS; Lee Silvi, Mentor, OH; Niel Wolfish, Toronto, Ontario; and Dave Zantow, Janesville, WI.



New England Beacons

One region that doesn't seem to get a lot of press in longwave circles is New England. With the exception of some very active listeners who live there, I don't get many loggings of New England beacons, even from listeners in adjoining states. We've written about the possible reasons for this before, and it is believed that two factors come into play. First, the ground conductivity in much of New England is poor due to the rocky terrain. This could reduce the efficiency of transmitting antennas used at the beacon sites.

Second, and probably more important, is the fact there are comparatively few beacons operating in New England. The FAA's *Airport/Facility Directory* makes this point clear, as it lists only four beacons in Rhode Island, five in Connecticut and eight in Vermont. (Massachusetts and Maine have considerably more beacons, but their numbers are still well below the "statistics" of many other states.)

This month, we'll focus on New England beacons as worthy DX targets. (Remember that a station needn't be far away to be considered DX – only rare.) My thanks go to Bob Fraser (MA), who provided the state-by-state listing that appears below. Bob excerpted these from the *Airport/Facility Directory*. He mentions that these booklets can be obtained from the pilot shops at most airports, and can be a useful resource for longwave monitoring. Sectional maps are also good (and interesting to look at), although they may not have all beacons marked and do not list them in a directory fashion.

Each *Airport/Facility Directory* covers a specific region of the USA and is updated several times per year as changes warrant. You might want to see if your local airport has any obsolete copies they can part with, although purchasing a new one at around \$4.50 will not set you back too far.

How many of the stations listed in the table can you hear? I would be interested in receiving logs from as many listeners as possible and will present them in a future issue of *Monitoring Times*. Please share what type of antenna and receiver you use, how long you've been exploring the longwaves, and any other details that might be of interest to MT readers. Shack/operator pictures are always welcome!

Speaking of New England Beacons, Don Hallenbock (ME) wrote via e-mail with more

information about BUP/348, which appears this month and also in the February loggings by Jacques d'Avignon. (You may recall that Jacques heard BUP during a DXpedition to Coe Hill, Ontario.)

Don writes: "That beacon is located East of the airport on a road known locally as Horseback Rd. in Burnham, ME. It's in a cement block building on private property to which the town has a right-of-way. The beacon used to be monitored in the local police dept. Comm. Center (before October 2001), but is now monitored in Skowhegan, ME, at the Regional Comm. Center." Thanks for the additional information Don, and we hope to hear from you often.

◆ End Notes

Perhaps it's my Irish roots, but I've always been fond of hearing LW broadcaster Atlantic 252 (County Meath, Ireland) coming through on cold winter nights. Their eclectic mix of rock music and off-the-wall programming was a refreshing change of pace from the all-talk format found on most other LW stations.

Well, a note in the Irish Amateur Radio newsletter reports that Atlantic 252 has changed to a predominately sports format, and will now be known as Teamtalk 252. I will miss their former programming, but I suppose the owners have done their research and consider the format change to be worthwhile. Atlantic 252 began its broadcasts in September 1989. Many thanks to John Wrafter (FL) for passing this information along.

The Longwave Club of America (LWCA) has presented its H. John Clements Memorial award to Dick Pearce (VT) for



SXD beacon (265 kHz) in Springfield, VT.
(Photo courtesy of Dick Pearce)

How many of these stations can you hear?

Connecticut

238 MMK Meridan
244 HF Hartford
257 TBY Waterbury
362 OX Oxford/Waterbury
388 BD Windsor Locks

Maine

216 LRG Lincoln/Millinocket
221 RQM Rangeley
227 BG Bangor
236 XQA Squaw/Greenville
240 LE Lewiston
251 MVM Machias
257 FVE Frenchville
260 EPM Eastport
260 ESG Eliot
272 OLD Oldtown
278 BST Belfast
278 PQ Presque Isle
330 BH Bar Harbor
334 RM Rockland
344 LNT Milnot/Millinocket
348 BUP Burnham/Pittsfield
349 SF Sanford
356 SUH Spruce Head/Rockland
366 AU Augusta
394 PW Portland
399 RL Waterville

Massachusetts

194 TUK Nantucket
205 ORE Orange
220 IHM Mansfield
227 TAN Taunton
230 BA Westfield
248 AC Nantucket
251 SKR Shaker Hill/Woburn
257 FFF Plymouth
269 TOF Topsfield
274 EW New Bedford
279 CQX Chatham
279 RS Dunca/Worcester
332 BE Bedford/Stow

342 HY Hyannis-Barnstable
346 LI Hull (Logan)
365 FIT Fitchburg
368 IMR Marshfield
370 DXT Dalton
375 BO Milton (Logan)
382 LQ Lynn (Logan)
389 PVC Provincetown
395 GBR Great Barrington
397 OW Norwood
402 LW Lawrence
417 EK Gozz/Worcester

New Hampshire

216 CO Concord
233 CNH Claremont
260 ESG Rollins/Rochester
276 LAH Hanover/Lebanon
281 HXX Hornbrook/Berlin
338 DRY Derry
359 AS Cherm/Nashua
379 IVV White River/Lebanon
386 GMA Mt. Washington/Whitefield

Rhode Island

216 BID Block Island
241 SFZ Central/Pawtucket
335 PV Renc/Pvidence
356 AR Armin/Providence

Vermont

221 DYO Smuta/Rutland
224 VWD Mt. Snow/West Dover
242 EFK Newport
265 SXD Springfield
268 VKN Mt. Mansfield/Montpelier
353 LIX Lyndonville
375 JRV Morrisville
382 BT Burlington

2001. The award recognizes Dick for his outstanding work as Editor of the *DX Downstairs* column in the LWCA's *Lowdown Journal*. Congratulations, Dick, and thanks for your efforts to make the hobby more enjoyable for us over the past several years. The H. John Clements award has been issued every year since 1984, in memory one of the founders of the Longwave Club of America.

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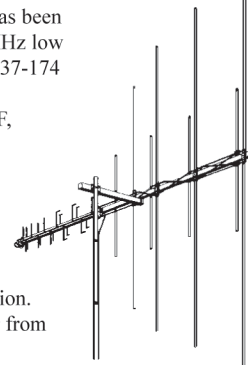
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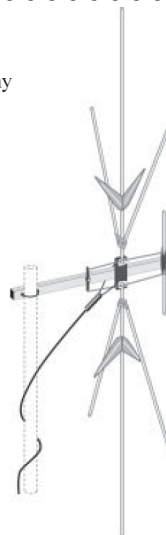
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SPECIAL: Now includes 50' of coax cable plus Motorola and BNC connectors!

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Picking Up Some Easy Points

Well, here we are at the beginning of April and even the most procrastinating of clubs and contesters are beginning to get their act together for the 2002 ARRL Field Day (June 22 1800 UTC – June 23 2100 UTC). I guess it's time for me to also remind folks that any group of hams – even two people or an individual – can put up a credible score in this event if they take the time to review some of the rules.

With almost any contest or operating activity, it pays to take a good look at the rules. Field day is no exception to this policy. Because of the nature of Field Day, the rules of the game reveal many easy ways to run up your score.

Now let me climb on my soapbox for a second here. The main purpose of Field Day is not contesting. It is all about hams demonstrating to the community and to each other their ability to quickly get on the air from remote locations. Demonstrating and maintaining these skills is how Amateur Radio proves its value to our society. Still, that does not mean it can't also be a fun time of friendly competition. Hence the points structure and the need to look at their value for the operator.

There are lots of ways to work this or any event's points structure to get the most out of every on-air contact. And, as you will soon see, with Field Day there are points to be had that don't even involve turning on your radios.

Right off the bat, you need to take a look at the advantage of going out and operating in the field as opposed to staying at your home station. If you operate from home and use your normal commercial power source, you are operating "Class D." The main disadvantage here is that you cannot count any contacts made with other "Class D" stations for points. In more populous areas, that could be the equivalent of essentially losing access to a third of the available stations or more. Further, you will have to dig all your legitimate contacts out from under the "Class D" stations you do encounter. In essence, these folks become little more than QRM to each other.

Operating in any other class, even from a home station, using *Emergency Power* (Class E) is well worth the effort.

Further still, only truly portable operations (Class A & B) are eligible for the hun-

dreds of *Bonus Points* that are available in the Field Day rules. We'll talk more about these valuable extra points a bit later on.

And, once again, don't forget the real reason we all play Field Day. We show the world we can get up out of our shacks and be of help wherever we are needed.

◆ To QSO or Two QSO

Let's start by taking a look at the basic QSO points themselves: Phone contacts are worth one point, but CW contacts are worth two. A high speed CW operator can generate QSOs at a blinding rate compared to a voice operator. The exchange is shorter by nature. However, if your "fist" is just average, you may find that the advantage isn't there for you. The way to get this sorted out is quite simple. Time yourself making a standard contest exchange (For Field Day this would be Callsign, Operating Class and ARRL or RAC section) by way of voice and then by way of code. If you can run faster "Qs" with a key in your hand, go for the points advantage.

But there is also another 2-point mode. That is *Digital* operation. If you are set up to do RTTY, PSK31, or the other digital modes, this is a great way to double your pleasure.

◆ More Power?

One of the most often missed ways of really running up your score in Field Day is the *Power* multiplier. Field Day, by and large, is not a DX type of contest. A glance at your logs from past years will most likely show that the majority of your QSOs were local and regional, with the rest being short-hop DX. With that in mind, a little bit of power goes a long way. Further, a low power station can be run more easily off of *Alternate Power*, another point multiplier we'll talk about in a few minutes.

A look at the Field Day rules shows that you can multiply your totals by 2 if you are using less than 150 watts. That is plenty of power to get the job done to any station in the world! Field Day is largely a North American show, so cranking things down to below 150 watts is a no-brainer.

But how about going even lower? QRP operation (5 watts or less) but powered by commer-

cial power or motor driven generator also yields the x2 multiplier.

The *real* points advantage comes when you run both QRP *and* alternate power (batteries, solar cells, water or wind driven generator). This brings you a multiplier of 5! Again, given that Field Day is going to produce dozens and dozens of shorter range contacts, you can find yourself staying just as busy as the "Big Guns" on Field Day weekend even if you are only running 5 watts.

◆ Picking Up Points 100 at a Time

Since the whole point of Field Day is to get out in the field, there are lots of Bonus Points offered for the cunning operator.

First of all, let's review something we've already talked about a bit. You can get 100 points for each transmitter you operate using 100% emergency power. Emergency power is any source *off the mains*. This includes motor power generators, probably the most common power source for Field Day stations.

You can get an additional 100 points for making a minimum of five contacts using any *Alternate Power Source* (batteries, solar cells, water or wind driven generator). If you are one of those folks who already decided to go for the x5 multiplier by operating 5 watts with alternate power, these two rules provisions are worth a minimum of 1000 points when you total up your score at the end of the Field Day weekend. You see how it can all work together to substantially improve your score.

Media publicity is another easy 100 points. It comes from writing up your operation and submitting this "Press Release" to



Triode ARC picture by Bob Grove



This little SST Transceiver could easily get you a x5 multiplier on Field Day

your local newspapers, radio and television stations. Make this contact with enough lead time and don't be surprised if somebody shows up at your site to take your picture or interview you. A simple "Who, What, Where, When and Why" statement is all you need. I was operating one year with a club in a public park. A man came over to look at our operation and asked if he could take a few pictures. Of course we said sure; we had no idea he was from a major regional newspaper and he turned his pictures and his comments into a full-page feature story. Great for him and an easy 100 points for us. (Murphy's law had stepped in and our group had forgotten to send in our Press Release. We got to step on old Murphy's toes by submitting a copy of this reporter's article along with our points.)

Setting your station up in a public location is another 100 points. Doing your radio thing at a shopping mall, public park or school ground is all that you need to do. Of course you need to get permission from the public entity, but I've seldom found this too hard accomplish.

There is something even more important than the 100 points generated by operating in a public place, however. Whenever I've been with a such group, we have always encountered one or two folks who were curious about ham radio but didn't know how to go about getting into the game. I think the rules should include a 1000 point bonus on next year's score for every verified new ham that last year's Field Day operation generates!

Along the lines of generating new hams and general interest in amateur radio, another 100 points can be earned by setting up a public information table. It is not hard to make up a short FAQ on ham radio and then photocopy this fact sheet for distribution. My group often puts out a couple of stacks of back issues of amateur radio magazines as give-aways. Photos of ham stations are also a good draw. Use your imagination.

The National Traffic System (NTS) is active throughout the Field Day weekend and there are many easy points available for doing a bit of basic *Traffic Handling*. For example, you get 100 points for sending a formal message through the NTS system to the ARRL Section Manager or Section Emergency Coordinator from your Field Day site. You also get 10 points for any NTS style message sent or received at your site up to a total of 100 points.

Not everybody has the set-up to do a satellite QSO, but if you are so inclined, you get an extra 100 points for the effort.

Each Field Day weekend, W1AW issues a special Field Day Bulletin. Copying this message at your site and submitting an accurate copy of this message nets you another 100 points. The field day bulletin schedule can be found on the ARRL Web site: <http://www.arrl.org>.

While phone, CW, and digital modes are all accounted for as regular QSO methods, if you are interested in other, so-called *non-traditional* modes such as SSTV, ATV, and APRS, demonstrating these modes in use is worth 100 point per mode up to total of three different demonstrations – a potential 300 ad-

ditional points. You can use a packet radio system as one of your demonstration modes only if it is set up as a truly portable node that is not part of the existing packet system in your region.

If your Field Day site gets a visit from an elected public official or agency served by the Amateur Radio Emergency Service (ARES), such as the Red Cross, the Salvation Army, or even local public safety or police, this is good for 100 more points. This is always an easy thing to do. Just call these folks up and invite them over. What could be simpler than that? What politician doesn't want to meet with voters? What public safety official doesn't want to meet with dedicated volunteers?

For a complete list of Field Day Rules, web on over to the ARRL site at <http://www.arrl.org>.

So, what are you waiting for? Grab your rig, some wire and a deep-cycle battery and get ready for a weekend of ham radio fun!

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2400 UTC

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Apr 6 1800 UTC– Apr 7
0500 UTC
Apr 7 1800 UTC – Apr 7
2400 UTC

April 13

QRP ARCI Spring QSO Party
Apr 13 1200 UTC– Apr 14
2400 UTC

April 20

Michigan QSO Party
Apr 20 1600 UTC – Apr 21
0400 UTC

Ontario QSO Party
Apr 20 1800 UTC – Apr 21
1800 UTC

April 27

Florida QSO Party
Apr 27 1600 UTC – Apr 28
0159 UTC
Apr 28 1200 UTC – Apr 28
2159 UTC

Parts and Periodicals

A while back, I promised to give you some information on sources of restoration parts and schematic diagrams for antique radios. I'd like to do that this month, and also mention what seem to be the major periodicals for antique radio enthusiasts. If I've missed someone, I invite the publisher or proprietor to get in touch with me for a mention in a future column.

Periodicals

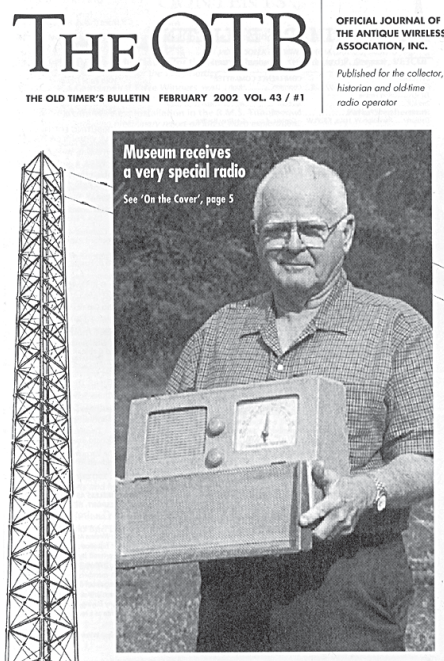
Of course you are all familiar with the column you are now reading, certainly one of the most pre-eminent in the field! It has been running in "MT" since January 2000 and in the Gernsback publication magazines for many years before that.

QST, the publication for members of the ARRL (Amateur Radio Relay League), also has a regular antique radio column, focusing primarily on vintage amateur equipment. That publication is available on full-service magazine racks (as found in major book chains such as B. Dalton's) if you'd like to thumb through a copy.

Popular Communications runs frequent articles on antique radio, covering vintage consumer receivers as well as amateur equipment. "PC" can also be found on well-stocked magazine racks, and this publication is a regular advertiser in *Monitoring Times*. You'll probably be able to find subscription information in this issue.

I know of only a few periodicals devoted entirely to antique radio topics. You'll probably see ads for two of them on the right-hand page of this column. *The OTB*, which I edit, is a quarterly for members of The Antique Wireless Association. It's pretty well-described in the ad, but you can find out more by logging on to our web site at the URL given. If you'd like to see a sample copy, write to our Secretary, Joyce Peckham, at Box E, Breesport, NY 14816. Tell her you heard about AWA in Marc Ellis' column in *Monitoring Times*.

The main focus of *Antique Radio Classified* is to serve as a trading post for those who wish to buy and sell vintage radio equipment. As the name implies, much of the magazine is devoted to extensive classified advertising. However, there are always interesting articles on various aspects



of antique radio collecting and restoration as well as very complete listings of the major antique radio clubs and their activities. As mentioned in an earlier column, the publication is also a dealer for a wide variety of books on vintage radio books from various publishers. Read more about "ARC" in their ad on these pages and check their web site at the URL given. They'll also send you a free sample copy on request.

An interesting and slightly offbeat publication you'll want to look into is the bi-monthly newsletter of the "Xtal Set Society." Members contribute construction articles for small radios of interesting electrical and/or mechanical design. Originally, the articles dealt exclusively with crystal sets, but the Society has branched out to include tube radios inspired by vintage designs. The organization also offers collections of its past newsletters in book form, sells parts of interest to builders of small radios, and is a dealer for books on vintage radio by other publishers. For more info, contact "Rebecca, the Crystal Queen," PO Box 1625, Norman, OK 73070-1625; xtalset@midnightscience.com; 1-800-927-1771. Tell her you got her address from

the Radio Restoration Column in *Monitoring Times*. If you are internet-equipped, you can also Rebecca's very complete web site at <http://www.midnightscience.com>.

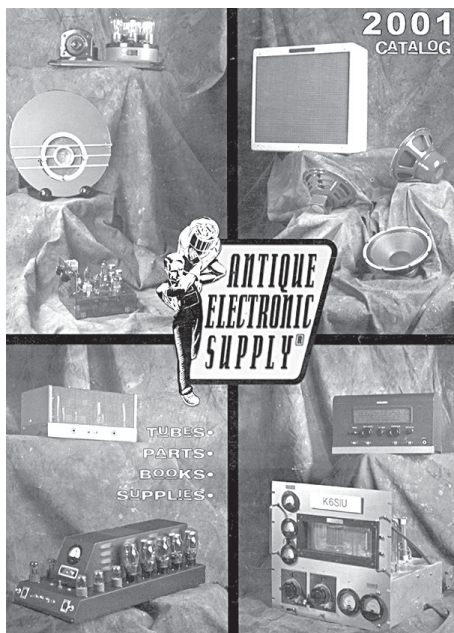
Parts

When it comes to acquiring parts, there is no substitute for regular attendance at antique radio meets. On those flea market tables, you'll find a never-ending variety of parts and tubes salvaged from old sets or offered in their original boxes as "new old stock." As your experience in the hobby grows, so will your understanding of the parts you'll want to acquire for future needs. Prices are usually quite negotiable, and dickering is part of the fun for both buyer and seller.



As in the area of periodicals, major suppliers of new parts and tubes for vintage radio enthusiasts can be counted on the fingers of one hand. However, a keyword search on your internet web browser will turn up many lesser-known, but equally-interesting, suppliers.

The first supplier that comes to mind



is Antique Electronics Supply (6221 South Maple Ave., Tempe, AZ, 85283; 480/820-5411; <http://www.tubesandmore.com>). This company includes in its catalogue the broadest spectrum of new, and new old stock, parts and tubes of interest to the radio collector and restorer. They also offer a wide variety of books on radio restoration subjects. In recent years, the firm has been diversifying into parts, tubes and speakers for vintage guitar amps. If you are into such things, the catalogue will have added interest for you. Write AES for a free one!

A much smaller, but very aggressive newer company in the vintage parts supply business is Radio Daze (7 Assembly Drive, Mendon, NY 14506; 716/624-9755; info@radiodaze.com; <http://www.radiodaze.com>). Right now their "catalogue" is just a 4-page flier (write or e-mail for one), but the offering on their web site is more extensive and a formal catalogue is in the works. Keep tabs on this little firm, it seems determined to become a major source for the hobby!

One of the most consistent needs of the serious antique radio restorer is for fixed capacitors of various sizes and types. These are necessary for the recapping process that is so important for any restoration work intended to be permanent. Both of the suppliers mentioned above carry capacitors. However, capacitor sales is the *only* business of Frontier Capacitor (PO Box 218, 403 South McIntosh St., Lehr, North Dakota 58460; 701/378-2341; frntcap@bektel.com). Stock is complete; prices are very reasonable; and service is fast. Minimum order is \$20.00 plus shipping (which is \$4.50 for all orders up to \$50.00; there is no handling charge). Call, write or e-mail for a price list.

While not, strictly speaking, a vintage parts source, I don't think any list of parts suppliers for old equipment enthusiasts

would be complete without mentioning Fair Radio Sales (PO Box 1105, 1016 E. Eureka St., Lima Ohio 45802; 419/223-2196; fairradio@fairradio.com; <http://www.fairradio.com>). Fair deals in military and industrial surplus, including complete pieces of equipment, subassemblies ripe for parts-picking, and individual parts, tubes and manuals. If you are working on military equipment, you might chance on exactly what you need. But Fair also has a lot of generic parts that might just work with other kinds of restoration projects. Write or e-mail them for a free catalogue. You'll also find a nice selection of interesting items on their web site.

Finally, every radio restorer has occasional need for new, currently-used parts not available at Radio Shack – whether it be capacitors as already mentioned, power resistors, transformers, electronic tools – or whatever. One of the best mail-order sources is Mouser Electronics (1000 North Main St., Mansfield, TX 76063-1511; 800/346-6873; sales@mouser.com; <http://www.mouser.com>). Contact Mouser for a free individual catalogue or a free subscription to their quarterly catalogue mailing. You can also download a complete catalogue or a section of a catalogue from the Mouser web site (this last is more practical if you have DSL service!). The web site also has a sophisticated search engine to help you locate the part(s) you want as well as links to the specialized catalogues of various electronics parts manufacturers.

Manuals

Many helpful individuals and groups have sites where manuals may be downloaded by anyone at no charge. Quite often, those who download manuals they don't have will scan and contribute those they do have as a form of payback. As a result, quality can be spotty. Some folks understand scanning standards that must be maintained to produce a good readable printout; others do not! I'm always looking for manuals for items I've purchased to restore in this column, and have been able to download enough usable material to save quite a few bucks.

Before considering the purchase of any manual – particularly if it is for military or ham radio gear – first carry out a keyword search with your favorite web browser. If you search on the manufacturer's name and/or model number of the radio in question, you'll turn up some of these free sites. If you make your search more generic (i.e. "radio manuals"), you'll find the sites of the many individuals and companies that will sell you copies.

I'll list a few of the commercial manual suppliers I've dealt with and have found very satisfactory. The first of these, and one of the oldest and best known, is Hi-Manu-

<http://www.hi-manuals.com>). Hi-Manuals specializes in ham equipment. Go to their web site for an on-line catalogue and ordering information. Or send \$3.00 for a hard copy of the current catalogue.

A.G. Tannenbaum (PO Box 386, Ambler, PA 19002; 215/540-8055; k2bn@agtannenbaum.com; <http://www.agtannenbaum.com>) is more of a full-service manual source. They stock manuals on almost anything electronic. Their offerings even include manuals for cameras and VCRs. Since Tannenbaum has a complete set of Rider's and Sams manuals, they can supply copies of servicing info and schematics for almost any vintage broadcast radio made. Need instant gratification? Many of these manuals can be purchased for instant download from the web site. Tannenbaum also sells vintage radios, amplifiers, test equipment, parts, tubes, books, magazines, and more. Inquire by mail, phone or e-mail or visit their web site for an interesting browse.

A much smaller, but very useful, source is Alvin J. Bernard (PO Box 690098, Orlando, FL 32869-0098; 407/351-5536; ni4q@juno.com). His catalogue is a quaint hand-printed 4-pager, but Alvin has some things that nobody else has and his prices are very reasonable.

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Antenna Primer Part III: Select an Antenna, and Build a Groundplane

To select an antenna to fit your needs, you should consider the frequency, or frequencies, on which you want it to perform, whether it should be directional or relatively nondirectional, and if you wish to utilize it primarily for DX or for close-in communication paths. You should also consider the potential sites you have available for the antenna, and the antenna's cost.

Except for the cost factor, we'll discuss these considerations below. For cost, just keep in mind that building your own antenna can often save you the major portion of the expense of an antenna as compared to buying a ready-made, commercially constructed antenna.

◆ Some Easy, General-Purpose Solutions

Many *Monitoring Times* readers want one of their antennas to support listening from the LF band on up to the HF band, and maybe even cover a bit of the lower end of the VHF band. Such an antenna would serve to monitor LF signals, beacons, the AM broadcast band, tropical bands, HF utilities, ham radio HF bands, and more.

For decent performance, convenience, modest cost, and ease of construction it is hard to beat a random-length wire antenna for the application just described. If long enough, it will have nulls (directions of reduced response), but

they are not deep for antennas at practical heights. This antenna's response is modestly non-directional. Building your own random-length antenna was covered in this column two months back.

For general local listening on the VHF-UHF bands, a groundplane antenna gives good response toward the horizon in all compass directions. It is perhaps the best solution for catching the action in your area. We'll discuss making these useful antennas below.

◆ Some Other Antenna Solutions

Perhaps you'd like a random-length antenna, but don't have the space. Then an active antenna is often a good alternative. Active antennas are small enough to sit on your operating table, simple to operate, and will usually give reception equal to a 50 ft or longer random-length wire antenna. On the downside, they will cost more than a random-length wire, and can be subject to intermodulation distortion and overloading from strong stations.

If you want to listen primarily to one frequency, or to one band, a good solution for general monitoring is often a halfwave dipole cut to the frequency utilized. For reception on MF or HF, it should function reasonably well over an entire band. Building your own dipole was covered in this column last month.

Mounting your horizontal antennas approximately a quarter wavelength ($246/\text{freq. in MHz}$) above ground tends to favor close-in communication paths, whereas mounting them a half wavelength ($492/\text{freq. in MHz}$) above ground gives better DX performance.

Keep in mind that on MF and most of the HF band received noise is high enough that, except for directional antennas, most antennas tend to yield similar quality of reception. As long as the antenna is large enough, or efficient enough, to capture sufficient signal for decent reception, then more signal strength is of little value. This means that on MF and the lower portions of the HF band, except for directional antennas, expensive or complex receiving antennas are generally no more effective than a random-length wire. If received noise is man-made, then a horizontally-polarized antenna may be less noisy than a vertically-polarized one.

It is true that directional antennas increase signal strength in their favored direction. But more importantly for HF and lower frequency reception, they reduce interfering signals and noise in other directions. This makes an important difference in reception if you are bothered by antenna-received interference. At the higher HF frequencies and above, where received noise is generally lower, a directional antenna's greater signal strength output is quite important in bringing weak signals above the noise level. HF beams, such as the Yagi-Uda or quad, are excellent choices from about 15

MHz through UHF, and can be rotated to direct your antenna's response in various directions. Phased beams are sometimes useful, but generally cannot be rotated.

◆ If You Transmit

For transmitting, the concept of antenna reciprocity tells us that an antenna's gain, feedpoint impedance, radiation pattern, and most other of its variables are the same, whether the antenna is transmitting or receiving. But, it is important to realize that a transmitting antenna and its feedline must be capable of handling the transmitter power fed to them.

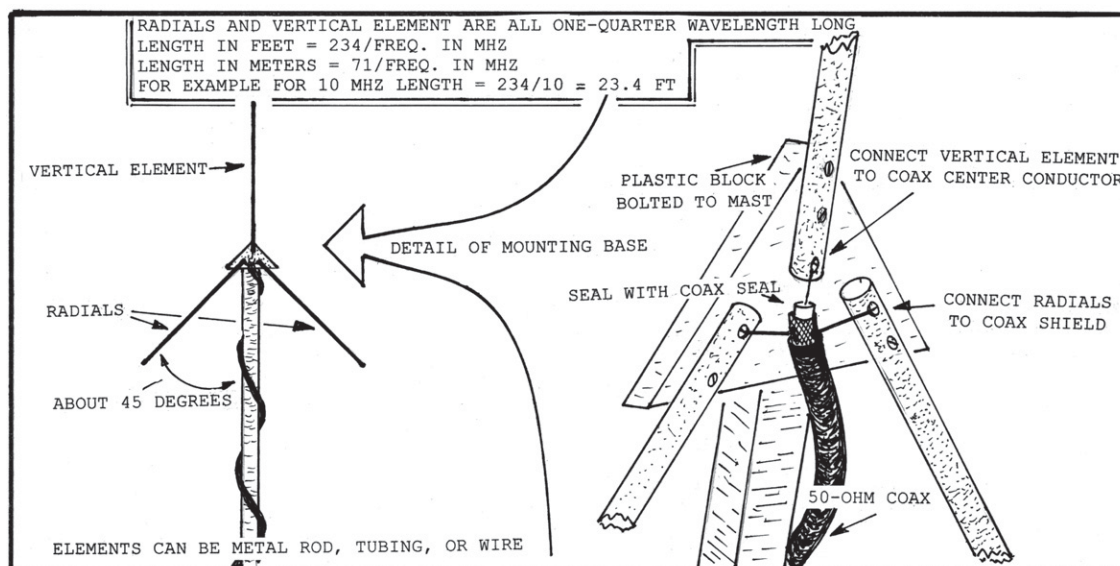


Fig. 1. One type of construction for a quarter wavelength, VHF or UHF groundplane antenna. Only two radials are needed. The text covers a construction technique for lower frequencies.

This Month's Interesting Antenna-Related Web site:

The ARRL is offering an antenna modeling course! Unfortunately, the course is half completed, but you can get a taste of it by going to: <http://www.arrl.org/cce/sample-lesson/>

Active antennas contain a small RF receiving amplifier, thus they cannot be used for transmitting. Desk-top loops, and Beverage antennas are not very useful for transmitting.

◆ **Build a Groundplane Antenna**

Groundplane antennas are practical and useful from microwave frequencies on down into the HF band. Their low vertical radiation-reception gives good all-around local coverage for HF and higher frequencies, and also great DX performance on HF. Fig. 1 gives the essentials for building one. For lower frequencies where the elements are several feet long, one method of construction is to make the antenna from wires terminated in antenna insulators for connecting to mounting ropes. The antenna is then tied in position with the top held high by a post or tree limb, and the radials tied to shorter posts, or other points, with ropes.

For antennas mounted outside, don't forget lightning-induced damage protection. The minimum is to never use them in weather likely to produce lightning, and disconnect and ground them when they are not in use.

◆ **Of Course There's More Than This**

I may have mentioned some antennas with which you are not familiar. I wish there were space enough to define them. On the other hand, there are many good antenna designs which I haven't mentioned at all. If you find that the above discussion whets your appetite, I'd like to urge you to look at some books on antennas. Then select the one that most appeals to you, and cover it in some detail.

Bob Grove's *Antenna Fact Book* is a very readable little book which covers a lot of basic information. It is currently out of print, but look for used copies or a future reprint. W6SAI's *HF Antenna Handbook* is a good introduction, especially for hams, with directions for building a variety of antennas. Joe Carr's *Practical Antenna Handbook* (4th edition) is excellent, and covers a very-wide range of topics, plus it includes lots of information on building and testing your own antennas. The ARRL *Antenna Book* is both technically excellent and filled with many practical plans for building amateur-radio antennas.

Many more good antenna books are available. Some libraries carry one or more books about antennas. To buy books, check both new and used book stores, internet book-stores, Ebay, and radio and electronic supply house catalogs.

RADIO RIDDLES

Last Month:

I discussed maximizing power transfer by matching impedances between an RF source and its load. I then asked "What about matching between a transmitting antenna (source), and space into which it radiates (load)?"

Actually, in practice, we do not try to match an antenna impedance measure with the 377 ohms impedance of space. What we do is minimize losses to the power fed to the antenna. These are losses such as the power lost as heat in the resistance of the antenna's conductors. Minimizing these losses leaves the largest possible percentage of the energy which is fed to the antenna for launching as radio waves.

This Month:

A Joke Instead of a Riddle: My friend, Pat Leonard, told me about two antennas that actually got married. He said that the wedding wasn't much, but that the reception was great!

By the way, send me your antenna jokes, and if they make me laugh I'll put them in a future column, and credit them to you.

You'll find another riddle, another interesting, antenna-related web site, and much more, in next month's issue of *Monitoring Times*. 'Til then Peace, DX, and 73.



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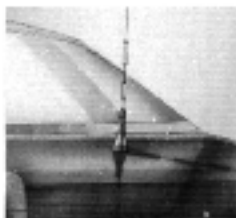
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Tk8500 Software Project

Using a computer and software to set a radio's options makes the job much simpler. Most receiver control and cloning software require a Microsoft Windows operating system and that's a shame, because I'm saying goodbye to Windows. One year ago, I set a personal goal of moving from Windows to the free, more stable Linux operating system.

I now use Linux 95% of the time and have written open source software to control and clone some of my receivers.

My first two projects, named tk545 and tk8500, are programs for the Japan Radio Co. NRD-545 DSP and ICOM IC-R8500 receivers. The programs are open source (<http://www.opensource.org>), licensed under the GNU General Public License. You can download, use, and modify the software free of charge from my web page at <http://members.core.com/~parnass>. Making the source code available permits you to learn by reading the design, make changes to suit your needs, and fix bugs yourself. Tk8500 uses no "secret" algorithms or cryptic data file formats. I don't warrant the software, but neither will it cost you anything.

Tk545 and tk8500 are "works in progress." Writing and modifying radio software can be great fun and I'll share with you some of what I learned about controlling the radios by computer.

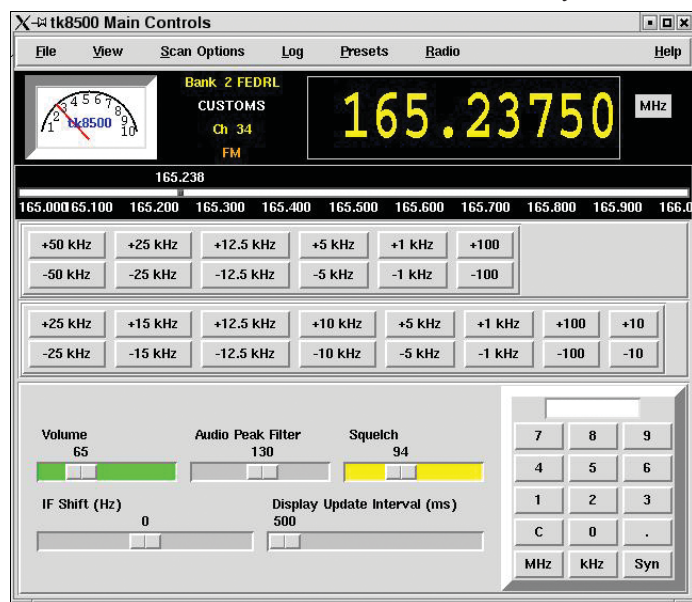


Figure 1- tk8500 main controls window.

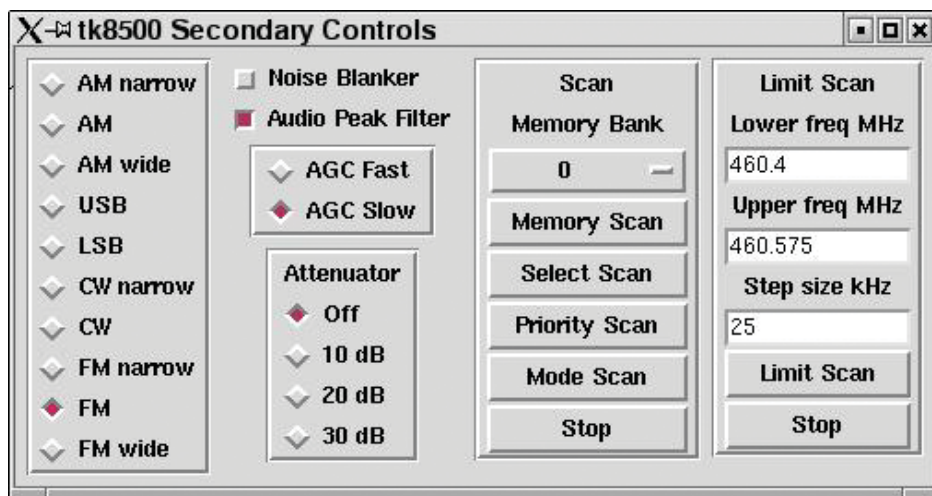


Figure 2- tk8500 secondary controls window

◆ A Word about Languages

Many radio control and cloning programs are written in Microsoft Visual Basic, a proprietary language which runs only on Microsoft operating systems. I use the Tcl (Tool Command Language) and Tk tool kit, known collectively as Tcl/Tk, because it's a powerful scripting language which works on several operating systems and costs nothing.

◆ Tk8500 for the ICOM IC-R8500

My radios are located in the basement and

I want to use them while I am upstairs. Tk8500 enables me to scan, search, configure, and perform other important operations remotely.

Tk8500 programs the IC-R8500's memory channels from a file in csv (comma separated values) format. I can use either a simple text editor to create, change, and print memory files or any one of a number of spreadsheet programs which "understand" csv files. Tk8500 can also read the radio's memory channels (fig. 3) and store them in a file. The program automatically

logs the frequency, date, time, mode, and signal strength of active frequencies while scanning.

◆ Designing Software for the IC-R8500

Developing software for the IC-R8500 is more complicated than for the NRD-545 and Uniden scanners. The IC-R8500 communicates with the computer using binary data, not ASCII, so software must encode data before sending it and decode it upon reception.

ICOM's CI-V protocol is designed to connect multiple radios and a computer together on a bus. The added power brings complexity. Ekki Plichty's web site describes CI-V in some detail <http://www.plicht.de/ekki/civ/index.html> and ICOM Parts (tel. 425-454-8155) can provide a photocopy of CI-V documentation for \$15.

According to the CI-V protocol, each radio and computer is identified by a unique "address." Each message exchanged between computer and radio contains the source and destination addresses, so control software must be able to recognize messages based on address. When a program sends a command to the IC-R8500, the command is echoed onto the bus and the software must be designed to ignore those "echoes" when reading from the serial port.

Though it's not mentioned in the IC-R8500 manual, packets can "collide" with one another if two devices send a message at the same time. When this happens, I've seen the radio send three consecutive 0xFC bytes. The software

| Step | Freq | Mode | Name | Status |
|------|-----------|---------|----------|-------------|
| 0 | 460.52500 | 12.5 fm | KNCOM P1 | |
| 0 | 460.57500 | 9.0 fm | KNCOM F1 | |
| 0 | 460.37500 | 12.5 fm | KNCOM P2 | 20 |
| 0 | 462.97500 | 12.5 fm | KNCOM F2 | |
| 0 | 155.47500 | 5.0 fm | ISPERN | select |
| 0 | 154.71000 | 10.0 fm | ExecProt | select |
| 0 | 155.46000 | 5.0 fm | ISP HF4 | select |
| 0 | 145.17000 | 5.0 fm | IHARC | |
| 0 | 155.58000 | 5.0 fm | Oswego | 10 |
| 0 | 146.52000 | 5.0 fm | SIMPLEX | |
| 0 | 148.60000 | 5.0 fm | ARMY JL | select |
| 0 | 154.95000 | 5.0 fm | CPAT | select |
| 0 | 145.77000 | 10.0 fm | CARMA | skip select |
| 0 | 419.65000 | 12.5 fm | USPS INS | skip |
| 0 | 52.52500 | 10.0 fm | 6M smplx | skip |

Figure 3- tk8500 channel list window.

must be able to recognize collisions and retransmit the command.

◆ Documentation vs. Reality

The IC-R8500 computer commands are listed in the instruction manual. However, my IC-R8500 (serial number just above 1000), does not behave under computer control as described in the manual (manual A-5395Y-1EX, copyright 1996). This makes writing the software more “interesting.” I hope to save other software developers time by documenting these contradictions.

The operating mode codes for AM narrow (0203) and AM wide (0201) are shown reversed. The Bank Selection command number is 08, subcommand A0, and has been corrected in a later edition manual. The correct codes for the various tuning step sizes appear in Table 1.

Both the IC-R8500 and NRD-545 display frequencies with 10 Hz resolution, but store an extra digit internally. While the NRD-545’s extra 1 Hz digit is fully functional, experimentation shows the extra digit in my IC-R8500 is not. Software can command the IC-R8500 to tune to 150.000005 MHz, but the rightmost (Hz) digit doesn’t appear to have an effect.

◆ Controlled Scanning

While the IC-R8500 is a great wide spectrum receiver, it is not the world’s best scanner. Nonetheless, I wanted to design software that could scan and perform limit searches.

I wrote, then removed, routines that implement

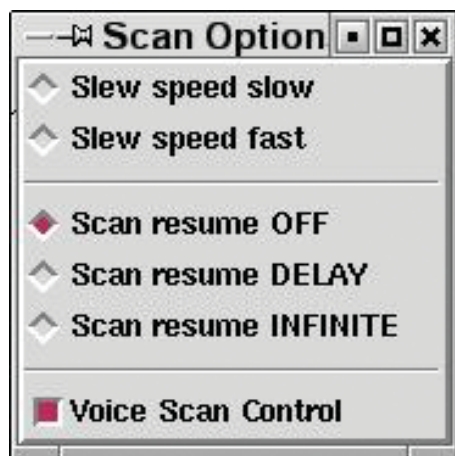


Figure 4- Scan options menu.

tion to carry the “carrier detect” signal. I could install a cable between a second computer port and radio’s Recorder Remote jack, but the notion of running a second cable and using an additional computer port is unappealing.

The current version of tk8500 lets the radio hardware and firmware perform the scanning at its full speed of about 40 channels/sec. Tk8500 polls the radio repeatedly, requesting the current squelch status, an indicator of whether the IC-R8500 found a signal. My original polling algorithm requested the radio’s frequency often so a user could see the frequencies change on the screen as quickly as on the radio’s front panel. I couldn’t make this work reliably, presumably because the radio cannot process messages on the computer port as quickly as the polling routine would send them.

I found a good compromise by redesigning the polling procedure to ask for the frequency only while the squelch is open, i.e., during signal reception. Tk8500’s frequency widget is blanked while scanning.

I normally scan with the Resume selection off when using the radio front panel. This configuration forces the radio to search for activity, hold for the duration of the transmission, and then resume searching 3 seconds after the signal ends. I tried sending the “scan resume selection OFF” and “programmed scan start” commands to the IC-R8500’s port without much success. The scanning halts and will not resume consistently after a signal ends. The problem occurs in Programmed Scan, Memory Scan, and Select Memory Scan.

ICOM’s own RS-8500 software makes no provision for scanning with the scan resume selection off even though the radio supports this from the front panel. At this time, it’s difficult to determine where to put the blame: on the documentation, firmware bugs inside the radio, or bugs in my software.

Enabling VSC (voice scan control) before starting a scan makes the IC-R8500 scan more closely to expectations (fig. 4). It resumes scanning after carrier drop, though the rescan delay varies from 1 to 3 seconds.

◆ Finale

There’s a need for radio software that works on Linux and MacOS X systems. Developing cross platform, open source software

the searching and scanning entirely within the computer. That is, the computer sends the frequency and mode information to the radio one channel at a time and queries the radio for squelch status in between. This makes for slow scanning due to the number of messages that must be exchanged between the computer and the IC-R8500 over the relatively slow (19,200 bps) serial cable. I could speed up the scanner by using a separate connec-

is a great way to spread knowledge, gather new ideas, and improve software quality. Hobbyists from as far away as England have contributed ideas and code to tk545. I hope tk8500 will grow as well.

Table 1- Tuning step codes for the author’s IC-R8500.

| Tuning Step (Hz) | Byte Code |
|------------------|-----------|
| 10 | 00 05 00 |
| 50 | 01 50 00 |
| 100 | 02 00 05 |
| 1000 | 03 50 01 |
| 2500 | 04 00 05 |
| 5000 | 05 50 01 |
| 9000 | 06 00 05 |
| 10000 | 07 50 01 |
| 12500 | 08 00 05 |
| 20000 | 09 00 05 |
| 25000 | 10 50 02 |
| 100000 | 11 00 05 |
| 1000000 | 12 00 05 |

Custom step size conforms to the code documented in the IC-R8500 instruction manual.

NOTICE: It is unlawful to buy cellular-capable scanners in the United States made after 1993, or modified for cellular coverage, unless you are an authorized government agency, cellular service provider, or engineering/service company engaged in cellular technology.

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Fingerprinting Transmitters: MoTron's TxID-1

This month we look at a computer and radio product that is quite interesting, but at \$800 is out of the price range of most casual radio listeners. The product, TxID-1, by Motron Electronics, claims to be able to identify different transmitters using the discriminator output of a radio, specialized hardware, and an IBM compatible running a DOS signal analysis program.

How does it "fingerprint" a signal? What is required for installation? Does it really work? These are a few of the questions we will answer; stick with us if you're curious.

◆ How does it "fingerprint"?

The principal of TxID's operation is based around the very careful "listening" to the first few hundred milliseconds (i.e., millionth of a second) when a transmitter is turned on. During this early turn-on period the signal does not just go from totally off to totally on. Rather, it is trying to reach a stable "on" state.

This initial turn-on waveform's shape and amplitude depend on a number of factors, including method of frequency generation. For example, if a phase lock loop oscillator circuit is used to generate the transmitter's signal, it has a unique "lock" time and lock-up signal. Without getting too technical, these are a function of a number of factors including the phase lock loop chip that is used, the idealized values of the loop components and their interactions, and the actual component values taking into account manu-

facturing tolerances.

Adding to the individuality of a transmitter are all the circuits and their components within the signal path to the antenna, subsequent to the frequency generating circuit. By the way, although in this case we have just considered a phase lock loop generator, the theory is just as valid for any circuit, be it crystal or a simple resistor/capacitor/inductor oscillator.

You can imagine that it is a bit of a trick to capture, digitize, filter, store, and compare the time and amplitude details of this initial signal. Motron has chosen a hardware approach using a CPU, RAM, EPROM, I/O control logic/ports and A/D and D/A converters. In short, it is a small, self-contained computer system.

The TxID-1 can also be used to control certain ICOM and AOR receivers, decode DTMF, CTCSS and DCS signals and control an audio tape recorder. However, these features were not tested since we were on the trail of a fingerprint!

◆ What is installation like?

TxID-1 consists of a PC Card, which installs in a PC, and an Interface Adapter, which connects to the PC Card via a connector. See Figure 1. The version of TxID-1 we received was the TxPorter, specifically made for use on laptop computers. This version comes with the PC Card installed in a metal box which is then connected to the laptop via the parallel (printer) port. In addition, 12 volts DC is re-

quired to power the card.

The Interface Box again connects to the PC Card, completing the TxPorter mobile/laptop configuration. See Figure 2.

◆ And now, the rest of the story

That's not quite the complete installation procedure. First, the radio that you will use must have a dc connection, via a 15K resistor, to the discriminator output. Since many factory-provided discriminator outputs are via capacitors for isolation, these require modification for use with the TxID-1. Since I was using my Yaesu FRG-9600 workhorse, I had to run a shielded cable from pin 9 of the discriminator chip (MC3357) to a little-used rear panel connector.

A connection to the receiver's AGC (automatic gain control) line is suggested by Motron, but is not essential. Being a minimalist, I chose to forgo the AGC connection hassles.

◆ OPAMP.exe – hope you can solder!

The software for TxID-1 comes on a floppy and includes a program called OPAMP.EXE which is critical for installation and setup. Remember the PC card? Well, on the PC Card is a 14-pin header, which MUST be configured via soldering resistors and jumpers. Those of you who cannot solder well can go to the last paragraph of the column! Careful, neat soldering is a must.

The input amplifier on the PC Card requires gain setting depending on the voltage swing of your receiver discriminator circuit. That's right: Hope you are also handy with a voltmeter. You're going to need the skill to measure the discriminator voltage when a signal is 8 kHz above the center frequency, and 8 kHz below the center frequency. For my receiver the swing was from 1.00 to 4.4 volts.

Armed with this data, running OPAMP.exe (in DOS) gives values of two required gain-setting resistors and the associated header pins for solder. Either a well-stocked resistor box or a nearby Radio Shack is required. Depending on which direction the voltage swings with increasing frequency, the soldering of a jumper between pins 7 and 8 may be required, as was the case for the FRG-9600.

Finally, the discriminator output is con-



Figure 1 – MoTron's TxID-1 Hardware

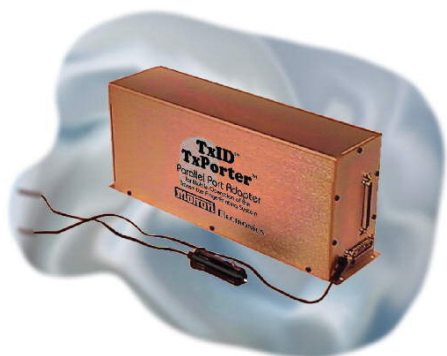


Figure 2 – The TxPorter For Mobile Use With Laptop Computers

nected to the interface adapter using shielded cable.

◆ Are we there yet?

Almost. Since the TxID-1 control software, version 2.95, is DOS based, the basic software installation is as easy as copying the floppy to the hard drive. However, for customization, dig out your old DOS book, since modifications of BAT files via a text program is required. Although once very proficient with these methods, years of using Windows have left me DOS brain dead!

So I took the easy way out and used the generalized TxPorter.bat file to start the system. I ran the program on a Pentium II 350 MHz laptop under Windows 98 and had no problem with the TxID-1 DOS program.

There was a bit more calibration procedure that needed to be performed, but finally we were ready to “dust some ‘prints.’”

◆ Leaving prints

I used three different FRS walkie-talkies for the test. Audiovox made two and the third was a Ranger (a WalMart special). All were tuned to channel 11 in the 460 MHz band. The FRG-9600 was connected to a back-of-set whip antenna and placed approximately five feet from the FRS units.

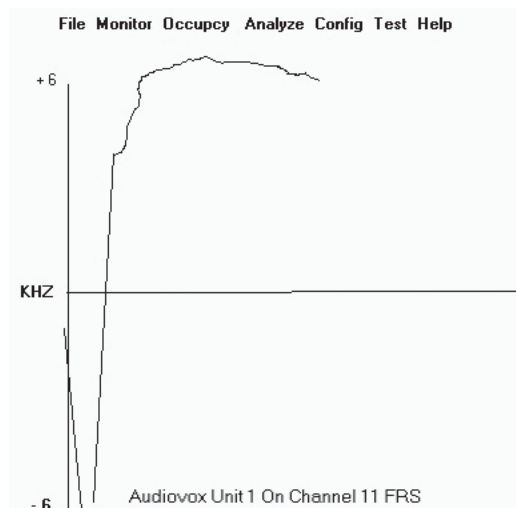


Figure 3 – Typical Transmitter “Fingerprint”

◆ Seeing is believing

Running the TxPorter.bat program displays a very simple DOS-type menu screen across the top. All the user needs to do is to key a transmitter and the program goes into action. The left side of the screen automatically displays a trace of the transmitter’s turn-on signal on the left of the screen. Using the menus, the trace can be captured, annotated, and then stored in a database. I did this for each FRS unit three times so that variations, such as transmit switch contact bounce, could be taken into account. Then I went to the compare screen and fired-up unit three, the Ranger.

Immediately, on the right side of the screen the new transmission was displayed as an overlay of the trace from the database which it most closely matched. TxID correctly identified it as the Ranger, unit three!

Even when this test was repeated with the two identical Audiovox units, TxID was able to pick out Audiovox unit 1 from Audiovox unit 2 eight out of ten tries! Based on such a small database sampling of only six traces (two for each unit) the results were excellent. A greater number of sample traces for each unit, which the program is capable of, would probably have resulted in close to a 100% match rate.

Interestingly, in many cases, the subtle difference in traces were not visually apparent; but TxID found them just fine.

◆ What, no screen shots?!

So let’s see the results, John. Although I tried for a few hours, I cannot show you the actual results, since my screen capture programs would not work while the TxID DOS program was running!! Sorry about that. Figure 3 is a drawing of a typical “fingerprint.” During the compare routine a second plot appears to the right. The real-time captured print, from the left, is overlaid with the closest match in the database.

◆ Fingerprinting is for real

This is my first experience with the Motron TxID and it has made me a believer. Due to its price (\$800 for the basic unit and \$300 additional for the TxPorter interface) plus the electronic measurement requirements, calibration procedures and soldering expertise, TxID is really aimed at a hard-core technical few and government agencies. Motron suggests one use is to provide positive identification of abusers on a repeater system. For those of you who have wondered about the technology, now you know how transmitter fingerprinting works. For more information, check out Motron’s site and other products at <http://www.motron.com> or write P.O. Box 2748, Eugene, OR 97402-0280; 1-541-687-2118. Grove Enterprises also has the Motron TxID for \$799.95; check it out at <http://www.grove-ent.com/dec3.html> or call 1-800-438-8155.

◆ In closing

For those of you who are medium wave insomniacs you may recognize the shortwave program link sent to me by Elaine from Windham, Maine. The link is <http://www.artbell.com/shortwave.html>. Check it out for frequencies, shortwave on the web and other related links. Till next time ... get some sleep.

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Getting Started in SW Listening - Part 2 Where, When, and How to Tune In

By Ken Reitz KS4ZR

All of us take for granted how the FM band works. We're familiar with the stations in our area, where they are on the band and when our favorite programs are broadcast. Things rarely change. FM signals are more or less the same, day or night, summer or winter, with or without any advantage of solar cycles. Shortwave signals couldn't be more different. Some frequencies are used only during the daylight hours while others are used only at night. Seasonal changes, the rise and fall of the 11 year solar cycle, current solar conditions, and local weather systems all play critical roles in reliable shortwave reception.

Newcomers to the shortwave bands can feel lost in the expanse of seemingly unused spectrum. There can be large gaps between stations on one shortwave band while on others stations appear to be clustered tightly together. Stations transmit for an hour or more and then disappear. A rainbow of languages and music come and go on the bands without any semblance of order. How can you know where to tune to hear what you want? How can you know when to tune?

First, we need to understand a few shortwave radio basics.

◆ Shortwave Radio Basics

Shortwave radios can be divided into two groups. **Analog** radios have "slide rule" style dials along which a pointer floats and the radio is tuned by turning a knob which causes the dial to move left or right along the printed dial. A **digital** radio has a Liquid Crystal Display (LCD) panel which indicates the exact frequency to which the radio is tuned. Tuning the radio can be done by entering the frequency directly via a tone-style pad on the front or by twisting a knob which causes the display panel to go up or down in frequency.

Analog display radios are usually cheaper than the digital display models, and tuning with

an analog radio is more difficult because exact frequencies can't be determined. Digital displayed frequencies are easier for the newcomer, because you simply enter the known frequency of the station to which you would like to listen and the radio tunes exactly to that spot.

Shortwave broadcast transmissions use the AM mode over a set of frequencies which stretch from just above the AM broadcast band (1.8 MHz) to just below the VHF low band (30 MHz). International shortwave broadcasting is done primarily within several sets of frequencies known by their relationship in wavelengths as measured in meters [see shortwave frequency chart]. For instance, the popular 49 meter band is a small set of frequencies around 6 MHz. The higher the frequency, the shorter the wavelength in meters. The 19 meter band is around 15.5 MHz.

The shortwave broadcast bands have been determined by international convention through a group called the International Telecommunications Union (ITU). Virtually all international broadcast stations transmit within the confines of these preset bands. During the daytime, when the sun energizes the atmosphere, shortwave transmissions can bounce off the ionosphere back to earth and back skyward, sometimes taking several hops to travel halfway around the globe. At night, when the atmospheric energy is dissipated, the higher frequency signals can no longer bounce, and the higher frequencies which had been active during the day with great shortwave signals are now quiet. Typically, the higher frequency bands are active during the local daylight hours and the lower frequency bands are more active during the evening hours local time.

◆ Get a Guide

It's not long after first tuning a shortwave radio that the listener can become frustrated looking for a particular station. Even after locating the station, it's hard to determine what the program line-up is. That's when you find that you need a guide. Each broadcast service such as the BBC, VOA, Radio Netherlands, etc. has a complete program guide on their web site along with a frequency schedule. But, if you are interested only in English language broadcasts, you can save yourself hours of web surfing and radio tuning by using a comprehensive guide such as the one found in the center pages of *Monitoring Times*. The *Shortwave Guide* is a 20 page listing of most international broadcasters and is updated each month.

The *MT Shortwave Guide* is divided into two listings. The first listing is by frequency and time

and indicates which transmission is aimed at what part of the world. For instance, at 7:00 pm ET we see that CFRX Toronto, Canada, can be heard on 6.070 MHz and that it's a domestic broadcast intended for Canadian listeners, but should be widely heard throughout much of the US. At 11:00 pm ET we see that Voice of Russia Radio can be heard on no fewer than eight frequencies, all aimed at North America. Using this part of the listing, simply check the clock, see what time it is and look for that time slot in the guide. The lengthy list gives you dozens of shortwave broadcasters to look for.

The second part of the *MT Shortwave Guide* is devoted to programming. It, too, is organized by time, but since space is limited, an ever-changing variety of programming is suggested for peak listening hours. For example, at 9 pm ET (0100 UTC) HCJB, Ecuador, features *DX Partyline* and *Latin American & World News* among others. At the same time Deutsche Welle will air *News*, a journalists' roundtable and a program on religion and society. Radio Habana Cuba will feature news, *Weekly Review*, and *Shortwave DXers Unlimited*, among others.

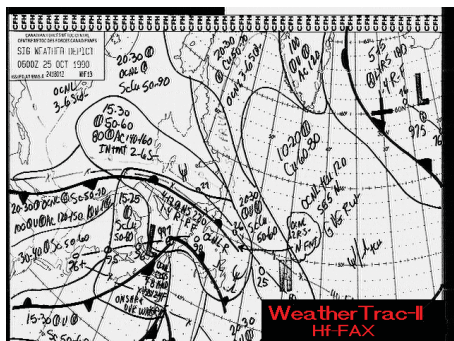
Look over the selected program guide at the time slot you'd like to be listening and then refer to the frequency guide for the exact location on the dial. Now the whole shortwave spectrum makes sense and it couldn't be easier.

◆ Time on Your Hands

When listening to shortwave stations you'll hear the time announced in 24-hour format such as "1350" followed by the words "Greenwich Mean Time" or "GMT" or "Coordinated Universal Time" or "UTC." Since shortwave radio stations transmit over the entire span of the globe and its 24 time zones, it's very convenient to have one time which everyone can understand. Here's how the U.S. government's National Institute for Standards and Technology (NIST) explains it:

"In 1970 the Coordinated Universal Time system was devised by an international advisory group of technical experts within the International Telecommunications Union (ITU). The ITU felt it was best to designate a single abbreviation for use in all languages in order to minimize confusion. Since unanimous agreement could not be achieved on using either the English word order, CUT, or the French word order, TUC, the acronym UTC was chosen as a compromise."

To make things even simpler, the acronym UTC is often replaced by the letter Z to indicate UTC. So that, in our example, "1350 UTC" may



HF weather facsimile courtesy of
www.sfwx.com



Time Zones courtesy CIA

be written as 1350Z or announced as "1350 Zulu." To understand the animosity which must have cut through the technical meetings back in 1970, you have to remember that most stations had been using the British designation Greenwich Mean Time and the abbreviation GMT for decades. You can imagine that things got a little testy when the British and French factions simply wouldn't budge on their positions, thus giving us all a compromise acronym.

You'll also note that the British never did give in. The BBC World Service still uses Greenwich Mean Time or GMT when announcing the time or their program schedule. You can check the actual Coordinated Universal Time with your shortwave radio by tuning in the US official time signal station WWV, Ft. Collins, Colorado, at 2.500, 5.000, 10.000, 15.000, and 20.000 MHz. The announcements are computer generated and controlled by the National Bureau of Standards atomic clock. For more information about these time signal stations visit the NIST web site at <http://www.boulder.nist.gov/timefreq/service>.

Canadian shortwave listeners can listen to CHU transmitting from the Dominion Observatory in Ottawa, Ontario, on 3.330, 7.335 or 14.670 MHz. Other countries provide similar time signal stations, an unofficial list of which can be found at <http://www.scn.org/IP/nwqrp/archives/misc/beacon.html>.

You may find it convenient at your listening post to have a clock which designates UTC. Small, inexpensive, digital clocks with 24 hour formats can be found in various shortwave product catalogs and range in price from \$10 to \$55.

♦ Strange Sounds on Shortwave

Casual listeners tuning across the shortwave bands in the AM mode often encounter strong signals transmitting what appear to be alternating tones or a buzz or whine. These stations never have audio announcements nor appear to identify themselves. What are they?

These are stations transmitting digital data. Some are in the form of a variant of Radioteletype (RTTY) while others sent imagery such as weather facsimile (WEFAX) and their identification is in the data stream. In the days before satellites the high frequency (HF) shortwave bands were packed with RTTY Baudot signals from virtually every international news service such as Reuters or United Press International (UPI). For decades these news services transmitted bulletins to their affiliates around the globe in the very inexpensive and easily accessed method using the RTTY

Baudot code.

Now virtually all such services have moved their transmissions to geostationary satellites, but a handful remain and are easily copied using a simple interface between your shortwave radio and your computer. In addition to being able to display RTTY, these modems can also display weather satellite

imagery, weather charts, Morse code transmissions and even Slow Scan Television (SSTV) used by amateur radio operators. The modems and associated software are available through most shortwave mail order catalogs.

There are still large numbers of agencies using the HF bands to transmit digital data including messages from governments to their foreign embassies, e-mail being sent to sailors on merchant vessels, or to cruise ships or military traffic to ships at sea. But the data being transmitted with these systems use more sophisticated modems and software and is beyond the scope of this article series. You'll find these regularly covered in the *Digital Digest* column, and also in this month's feature on *Who's Who in the Radio Spectrum*.

Among other strange sounds you'll hear in between the international shortwave bands will be random voice exchanges, intermittent data bursts, and the famous "numbers" stations which mysteriously appear on certain frequencies with a male or female voice announcing a long series of numbers in English, Spanish, German, Chinese and several other languages, and said to be secret messages being transmitted to agents in the field. Well, there's still enough intrigue on the shortwave bands to fill several novels and all you have to do is tune in. You never know what you might hear: Russian Navy, Israeli Intelligence, U.S. Customs Service, or even Air Force One.

Next Time: Digging deeper into the shortwave bands. Shortwave listening clubs and organizations, improving your listening post with a better antenna, external filter devices, and the art of QSLing.

SHORTWAVE BROADCAST BANDS (AM)

| | |
|-----------------|------------|
| 2300-2495 kHz | 120 Meters |
| 3200-3400 kHz | 90 Meters |
| 3900-4000 kHz | 75 Meters |
| 4750-5060 kHz | 60 Meters |
| 5850-6200 kHz | 49 Meters |
| 7100-7350 kHz | 41 Meters |
| 9400-9900 kHz | 31 Meters |
| 11600-12050 kHz | 25 Meters |
| 13570-13800 kHz | 22 Meters |
| 15100-15800 kHz | 19 Meters |
| 17480-17900 kHz | 16 Meters |
| 18900-19020 kHz | 15 Meters |
| 21450-21850 kHz | 13 Meters |
| 25600-26100 kHz | 11 Meters |

(from reference section at www.monitoringtimes.com)

HF Weather Facsimile

Selected National Weather Service radio fax broadcast schedules. All radio fax broadcasts of National Weather Service products employ a radio fax signal of 120 lines-per-minute (LPM) and an Index-of-Cooperation (IOC) of 576. These values must be entered into the users equipment or software program in order for the radio fax image to be displayed properly.

Boston, Massachusetts (NMF): 6340.5, 9110 and 12750 kHz
Start Broadcast 0230Z 0800Z 1430Z 2005Z
Broadcast Schedule 0243Z 1903Z
Ice (Seasonal, ~Feb-Sep) International Ice Patrol,
call letters NIK 1600Z 1810Z

New Orleans, Louisiana (NMG): 4317.9, 8503.9 and 12789.9 kHz
Start Broadcast 0000Z 0600Z 1200Z 1800Z
Broadcast Schedule 0630Z 1830Z

Kodiak, Alaska (NOI): 2054, 4298 and 8459 kHz
Start Broadcast 0400Z 1000Z 1800Z 2200Z
Broadcast Schedule (Mon, Fri) 1838Z

Point Reyes, California (NMC): 4346 (except 2300Z), 8682, 12730, 17151.2 and 22527(2300Z) kHz
Start Broadcast 0245Z 0815Z 1100Z 1415Z 2015Z 2300Z
Broadcast Schedule 1104Z 2324Z

Honolulu, Hawaii (KVM70): 9982.5, 11090, 16135 and 23331.5 kHz
Start Broadcast 0533Z 1150Z 1733Z 2350Z
Broadcast Schedule 0533Z 1150Z 1733Z 2350Z
(Note: National Weather Service station, not U.S. Coast Guard)

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100 North Hill Drive #42, Brisbane, CA 94005

Radio Shack's Excellent GMRS Handi-Talkie

Maybe someday years from now we'll look back and realize this ... right now, today ... was the Golden Age of two-way radio.

It sure seems like it might be. Cell phones are proliferating everywhere, and despite what the Finest Representatives Money Can Buy might tell you, cell phones really are two-way radios, but hooked into the phone system. Family Radio Service has also taken the country by storm, and almost any discount store you choose has them at a fraction of the price they were just a few years ago.

When people get turned on to FRS, it's easy to understand why. It's license-free, so there's no government hassle. It's FM, so the communications are generally crystal clear until you get to the extreme limit of range (usually 1/2 mile to a mile, although most manufacturers claim up to two miles). And it's in the 462-MHz range, so, unlike 27-MHz CB radio, there's no problem the sudden intrusion of unwanted "skip" signals from afar.

In short, FRS is darn-near the perfect radio service for very short range communications. Leveraging the success of FRS, many manufacturers are now bringing out General Mobile Radio Service handi-talkies that offer more power, more range and can also communicate with FRS handi-talkies.

Radio Shack's offering is called simply the 2-Way GMRS radio. Want to know Radio Shack's thinking on this radio? Just check out the copy on the box:

- GMRS 5-watt output delivers longer range than 1/2-watt FRS.
- First seven channels are shared with FRS for communication between FRS and GMRS radios.
- 38 selectable quiet codes – virtually eliminates interference.
- All-station Weather Radio with Severe Weather Alert.

The RS GMRS puts out a choice of 5 watts or 1 watt (to save power) on 15 channels:

0. 462.6750
1. 462.5625
2. 462.5875
3. 462.6125
4. 462.6375
5. 462.6625
6. 462.6875

7. 462.7125

8. 462.5500

9. 462.5750

10. 462.6000

11. 462.6250

12. 462.6500

13. 462.7000

14. 462.7250

Channel 0 is designated as the emergency channel in the manual for this radio and it is really a GMRS channel. The next seven channels are labeled as "Interstitial," which means they are shared with the Family Radio Service, but the manual never says that explicitly. The last seven channels are designated GMRS only. On the back of the retail box and on the very first page of the manual, Radio Shack clearly states that a license is required. The manual also gives the number to call to get the licensing forms.

The RS GMRS measures just 5-5/16 inches x 2-5/16 inches x 1-3/8 inches, excluding belt clip and antenna. It's a hefty radio, weighing just over 13 ounces, and it feels solid in the hand. A good part of that weight comes from a substantial rechargeable battery pack that can be detached from the bottom of the radio. The manual says this battery will provide 11 hours of operation at low power and about five hours on high power. A wall wart transformer to recharge the battery is included with the RS GMRS.

On the front of the RS GMRS is a liquid crystal display that serves as information central for the handi-talkie. The LCD is surrounded by six buttons: UP, DOWN, WX, DUAL, QUIET, and HI/LO. Push any of them, and the LCD backlight is activated. The UP and DOWN

buttons are used for changing channels, scanning channels, and setting, with the help of the QUIET button, Continuous Tone-Coded Squelch Codes (CTCSS, called Quiet Codes by Radio Shack) that block unwanted transmissions. The RS GMRS also has the capability to scan for CTCSS codes.

The HI/LO button controls power output and the Auto Power Off feature. The DUAL button activates dual watch capability, which can involve two operating channels or one operating channel and one weather channel. The WX button turns on the Weather Radio. Using the UP/DOWN buttons, the operator can select from 10 different Weather Radio frequencies or can scan them. The QUIET button can be used to mute the Weather Radio until an emergency alert tone is received. Above the LCD is a speaker and microphone grill.

On top of the RS GMRS is a flexible 4-1/2 inch antenna that can be readily detached for the use of an external antenna. Also on top are an ON/OFF/VOLUME knob and a surprise I've not seen in a while: a manual squelch knob. Whether or not the unfamiliar control will cause confusion for the uninitiated, I don't know, but I like being able to control the level of squelch myself.

On the right side of the case is a lug for the attachment of a wrist strap, a jack for a speaker microphone, and a jack for the battery charger. On the left side, you'll find a push-to-talk button and a MON/FUNC button that can be used to activate various special functions and to momentarily defeat the squelch. On the back side of the case is a fixture for attaching a removable belt clip.

Everything worked on the RS GMRS exactly the way it is supposed to: the audio on transmit and receive was exceptionally clear; range was excellent, and the weather radio sounded just fine. The cost of a single Radio Shack GMRS, including rechargeable battery and charger, is \$149.99. Considering all you get and the excellent performance, that looks like a pretty good deal.

The RS GMRS offers FRS, GMRS, Weather Radio, and rechargeable power all in one package.



Charging an Oddball NiCD Pack

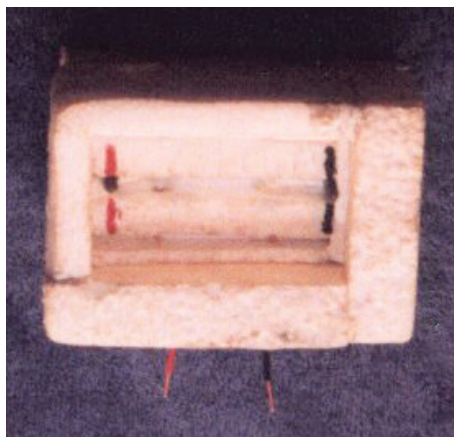
By Alan Bosch/KO4ALA

There will be those times when the ham, scannist, or SWL is confronted with the need to charge a battery unlike any other in his/her inventory. That happened to this writer recently with new, higher voltage (13.2 v/1000mAh) packs for a pair of Maxon 210+3 GMRS HTs that had Icom-like charge-points on their bottoms – quite unlike my Yaesu ham HTs or cherished Regency handheld scanner.

◆ A Quick-and-Dirty HT Charger

Once inspiration struck, all it took was some hard Styrofoam and several nails.

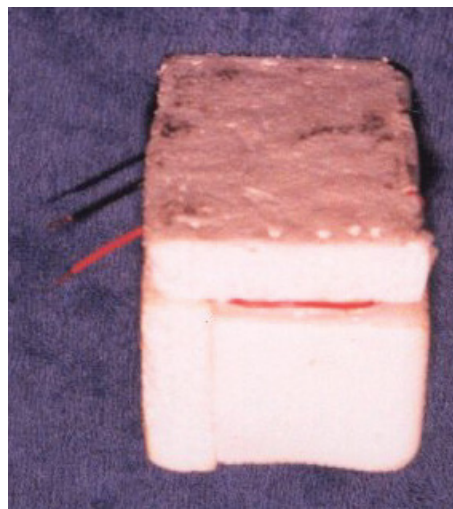
The first version was constructed like a breadboard project on the styro end-piece from some telephone packing, by tracing one HT's bottom and marking the contact positions. Then I pushed two 1.5-inch roofing nails through the foam from underneath so the contacts could rest on the nails with enough space beneath them to wiggle in the alligator leads connected to a variable power supply.



Roofing nails turned out to be the best because their substantial shafts and heads made them stable in the foam and their pyramidal points caught the Phillips-head screws on the battery bottoms, making it easier to settle things in "blind" from above.

The next step was to attach the alligator leads, set the battery atop the nail-points, and snug it in position there with three 2-inch finishing nails inserted from the top in rows along the front and back. With the power supply cranked up to 100 mA, fourteen hours later

the first pack read 15+ volts. The HT itself now put out 5W (vs. 2W with its OE 7.2 / 600s), and three REACT repeaters were readily accessible in my hilly suburb.



◆ Mark II

This gum-and-baling wire approach was functional, but not too convenient – and not at all elegant. Inspiration struck again with a way of upgrading the original in two steps.

The first involved making a base from two layers of sheet Styrofoam from Home Depot, sized to the bottom of the pack with the nail heads sandwiched between them and permanent leads brought out to one side.

The second involved boxing the base with foam sides tall enough to steady the HT/pack combo and attached with Elmer's glue braced with toothpicks. The four corners were later strengthened and finished with quarter-round. (Styrofoam, by the way, can be readily cut with a serrated steak knife – and it's best to use the densest foam you can find.)

Thus was born the drop-in unit shown in the photos.

The real charm of the foam-and-nail breadboard technique is that it can be quickly configured for any battery pack with point or plate charging contacts on its bottom or back. Be leery, however, of using it with packs whose contacts are on the top – it's too easy to short things out.

◆ Other Simple Chargers

By the way: should you ever need to handle a bunch C- or D- NiCDs that overflow your dedicated charger, consider the lowly plastic shower curtain rod cover. It can be used with two to eight cells.

There are two tricks involved. First, for rigidity, make a tube from two pieces of rod cover with the open seams set opposite each other. Second, for contacts, make end-caps out of rubber chair feet and fit them with short 4-40 machine screws and nuts centered in the feet with their heads inside. Those with a 1-inch internal diameter are snug on C cells; those with 1.2-inch diameter will fit D cells.

Radio hobbyists cannot get through life without batteries, but there is no need to let batteries complicate your life.

ANTENNA TIP

By Alan Bosch

You say just lost the tip button off your favorite mobile antenna and don't want to disfigure it with a cork? Don't despair.

Break out the shrink tube and cut off a half-inch piece. Slip it on the antenna and shrink it down. Then screw a wire-nut down onto the tubing.

Use a couple of pieces to get the right diameter if need be, and use a bright color wirenut for extra visibility.

There you go.

Performance Upgrades

Kiwa offers performance upgrades to improve the performance of the following receivers:

AOR AR7030
CC Radio
Icom R71 R75
JRC NRD 525 NRD 535 NRD 301A
Lowe HF150 AP/SP150
Radio Shack DX390/392 DX394 DX398
Sangean ATS909 ATS818
Sony ICF2010
Yaesu FRG7 FRG100

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kiwa@wolffnet.com

www.kiwa.com (full catalog)

What's NEW

Tell them you saw it in *Monitoring Times*

Alinco DJ-S40T Pocket HT

Alinco has announced the DJ-S40T UHF handi-talkie (HT), a pager-sized transceiver that replaces the Alinco DJ-S41. The new model has several improvements over the original and can transmit with up to 1-watt output with the optional Ni-MH battery or external DC power.

The new DJ-S40T has a "normal" output of 500 mW, 100 memories, a call channel, several scan modes and more. It covers the entire US UHF Amateur Radio allocation of 420 ~ 450 MHz, with receiving capabilities beyond the allocated transmission range.

The new case is designed to conceal the speaker while providing clear audio. The antenna is now a standard SMA fitting. There are 38 CTCSS encode and decode settings and four tone bursts that make the unit usable for repeater operations in many parts of the world. The large illuminated display is easy to read and provides information about a number of useful features.

Alinco's experimental "mosquito repelling feature" has been added to the unit, along with a theft alarm function and the ability to clone units by cable. Many Alinco accessories, such as a wide variety of speaker mics and power cables, are cross-compatible with the DJ-S40T.

In addition to normal simplex and repeater operations, a very popular application of the tiny transceiver could be its use through

cross-band transceivers, essentially using the DJ-S40 as a "remote mic" through a base or mobile dual-band transceiver.

"The DJ-S41 proved there is a market for pocket transceivers and that most areas served by repeater systems do not require high power in order to achieve reliable communications," said Craig Cota of ATOC Amateur Distributing, which distributes Alinco products to dealers in the USA and Canada. "The DJ-S40 is an exciting 'next step' in the evolution of small-size, full-featured radios that are fun and affordable."

The MSRP for the DJ-S40 is \$109.50, but street prices are often below the suggested retail.

Grundig Satellit 900 Update

A spokesman for Grundig confirms the current development of a Satellit 900 portable shortwave receiver; a release date is still too distant to announce. The new portable will not replace the popular Millennium 800, which will remain in production as their top model; the Satellit 900 is expected to be a follow-on to the smaller Satellit 700.

Improved Contact Cleaner

Long a favorite "fix-it" trick of experts like Doug DeMaw and Ken Reitz, contact cleaner spray can cure a myriad of ills in your electrical equipment – including your radios. Caig Laboratories makes a cleaner called DeoxIT, and they announce they have improved the formula for better performance and longer-lasting protection.

According to their press release, "DeoxIT is formulated to dissolve oxidation, increase current carrying capabilities and



provide continuous protection on metal surfaces from wear, abrasion and atmospheric contamination. Batteries last longer, light bulbs shine brighter; audio/video equipment sounds and looks clearer..."

Sounds like a bargain for just a few bucks! DeoxIT comes in a variety of applicators: sprays, pumps, wipes, pen applicators, etc. A 75 ml aerosol can of 100% solution is about \$14.95. Ask for it in your favorite electronics store or order online at <http://www.caig.com>.

By the way, the 100% solution is available under two names: DeoxIT and R5 PowerBooster; they're the same product, and are nonflammable and safe on plastics. The 5% solutions are slightly different formulas.

Navigating Europe

If you're planning take our "Radio Landscape of France" feature article and tour Europe on your own, Garmin has four new products that won't steer you wrong. Garmin has packages for use with a personal computer or with the Street Pilot III and can be integrated with the GPS V. These include City Navigator Europe, City Select Europe, MetroGuide Europe and Roads & Recreation Europe. Coverage includes motorways, national and regional thoroughfares and local roads. City Navigator (\$291.65) and City Select (\$174.98) show points of interest such as food and

drink, lodging, border crossings, petrol stations, hospitals, etc. Coverage is by region, which is selected and unlocked by visiting Garmin's web site.

MetroGuide Europe (\$174.98) and Roads & Recreation (\$116.65) do not require region unlocks. Instead, they allow maps to be imported from compatible programs such as eMap, eTrex Legend and Vista, GPSMAP 76, etc.

For more information, visit Garmin's website at <http://www.garmin.com>, or contact them at Garmin International, 1200 East 151st Street, Olathe, KS 66062; 913-397-8200.

For fishermen and recreational boaters, Garmin has also expanded its coverage of off-shore marine cartography to include Southern Bahamas, Southeast Caribbean, Southern Gulf of Mexico, South American East Coast, and South American West and Central American coasts at a price of \$149.99 each.

Rohde & Schwarz Miniport Receiver

Cast your eyes on this beauty – and then forget it, because at around \$20,000 you can't afford it, even if it was available in the United States! The Rohde-Schwarz EB200 is a miniaturized portable professional receiver for the HF-VHF-UHF range. Carried on the body and used with the Active Directional Antenna HE200, you're all set for stealthy or remote monitoring, or packing it out where cars can't go. Sensitive but sturdy, this receiver can detect unlicensed transmitters, track down sources of interference,



What's NEW

Tell them you saw it in Monitoring Times

detect spy transmitters (bugs), or monitor and scan frequencies from 10 kHz to 2 GHz.

If you want to drool over the specs, just visit <http://www.rohde-schwarz.com> or <http://www.elixcom.sk/eb-200.htm>.

Portable RF Analyzer

The Model 7500 RF Field Strength Analyzer combines the functionality of a graphic RF spectrum analyzer, frequency counter, and tunable RF monitor in a single, hand-held instrument. Broad frequency coverage of 100 kHz to 2060 MHz, and compatibility with AM, single side band (SSB), and narrow or wide band FM, make the analyzer suitable for a range of RF signal analysis, detection, and verification tests.

The user can define and name channels, and include up to 160 channels in a scan. Channels are scanned at the rate of 12.5 ch/sec. The analyzer can also compare and report the difference in strength of signals on two separate frequencies. On-board memory can store up to 10 setups for each operating mode, as well as the results of up to 10 displays, each showing up to 160 channels. The analyzer's seven-digit frequency counter operates over a range of 9 MHz to 2 GHz, with a resolution of 1 kHz.

An internal, pushbutton-selectable, -10dB attenuator enables input sensitivity to be adjusted in order to extend measurement range. Standard accessories include six AA rechargeable NiCad batteries, recharger, vehicle power adapter, detachable 9" whip antenna, operator's

manual, RS-232 cable and software, carrying case and strap, earphone.

The TEGAM 7500 is \$2195 from TEGAM, Inc., 10 Tegam Way, Geneva, OH 44041. Tel: 440-466-6100; Fax: 440-466-6110; <http://www.tegam.com>.

Always on call?

Peregrine Control Technologies, Inc. has introduced the Falcon™, a wireless remote control that uses POCSAG paging signals in the VHF, UHF, or 930 MHz paging bands to control virtually any electrical device from any geographic location. Designed with the computer professional in mind, the Falcon™ allows you to reboot locked-up machines, "remotely"!



The Falcon™ comes standard with two individually controlled power outlets, one normally open/normally closed relay output and a one line telephone disconnect. Remote control of the power outlets allows for full system reboot by disconnecting incoming power. The normally open/normally closed relay output allows for easy wiring to any reset switch or external relay device. The phone line disconnect allows you to control access to your modem, eliminating the need for fire walls. The NightHawk is a similar product with only one power outlet control.

Remote control products can, of course, be used to turn on or off any device – lights, water pumps, highway signs, rental property telephone lines – anything that requires a flip of the switch or push of a button. For additional information visit <http://www.peregrinecontrols.com> or call (303)337-4811

BC780 Remote Head Adapter

Scanner Master is currently developing a remote head adapter for the Uniden BC780XLT, especially for use in vehicle installations. Using the RSC-1, the control head of the Uniden-Bearcat BC-780XLT can be installed in a center communications console, a dashboard front, a dashboard top, or a specialized command vehicle installation. The adapter will use microprocessors to multiplex the signals, allowing for only a few wires within a single cable. This configuration will also enable the user to snake the wire to the 780 without any connectors on it as well as easily affix connectors after snaking is completed. The connection will be small, permitting easy mounting at a number of angles. The design also prevents RF interference from affecting the connection and also allows for remote mounting at relatively long distances.



For price and availability, see the Scanner Master website at: <http://www.scannermaster.com> or call 1-800-722-6701.

MFJ Speech Enhancer

"As I got older, my high frequency hearing loss was destroying my ham radio for me..." said Martin F. Jue, K5FLU, President and Founder of MFJ Enterprises, Inc. He decided to do something about it.

After extensive research into what makes human speech intelligible, Jue designed a speaker which drastically in-

creased the speech energy above 500 Hz where 83% of intelligibility is concentrated and reduced the speech energy below 500 Hz that contributes only 4% of intelligibility.



Amateur radio communications limit audio to about 300 to 2700 Hz. Jue split the audio band into four overlapping octave ranges. Each range could be boosted or cut by nearly 20 dB to give full control and maximize speech intelligibility for most kinds of frequency loss. The output audio is also split into left and right channels with separate 2.5 watt amplifiers; using the balance control lets you equalize the perceived loudness to each ear.

The Speech Enhancer will help you understand QSOs better and enjoy ragchewing and contesting more, even if you don't have high frequency hearing loss. The unit includes a front panel phone jack, on/off speaker switch, two selectable transceiver inputs, a bypass switch for in/out comparison. It's built into a 10-inch wide by 2.5-inch high by 6-inch deep aluminum enclosure and uses 12 Vdc.

The speech enhancer can also be used to improve your rig's audio; to eliminate hum, buzzes, poor frequency response, low power; to use with public address systems, internet phone, marine or aircraft radio – you name it. The Speech Enhancer is \$169.96 from MFJ Enterprises, P.O. Box 494, Mississippi State, MS 39762(800) 647-1800; <http://www.mfjenterprises.com>

Books and equipment for announcement or review should be sent to "What's New?" c/o Monitoring Times, P.O. Box 98, 7540 Highway 64 West, Brasstown, NC 28902. Press releases may be faxed to 828-837-2216 or emailed to mteditor@grove-ent.com.

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"No doubt about it, the future is here! Sure nice to get the magazine so early, this has got to be the way! Thanks for a great job!"

- Charles (Chuck) Boehnke
Keaau, Hawaii

"You and the MT staff that put this project together have done a FANTASTIC job. You would seem to be the leaders in the field presenting material in this manner so it can be archived so easily. This is the way to receive a magazine."

- Don Nauer

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EDITORIAL STAFF

Correspondence to columnists may be mailed c/o Monitoring Times; any request for a reply should include an SASE.

| | | |
|-----------------------------|-----------------------------|--|
| Frequency Manager | Gayle Van Horn | gayle@webworkz.com |
| Frequency Monitors | Mark J. Fine | mark.fine@fineware-swl.com |
| Program Manager | John Figliozi, KC2BPU | jfiglio1@nycap.rr.com |
| American Bandscan | Doug Smith, W9WI | w9wi@bellsouth.net |
| Antenna Topics | W. Clem Small, KR6A | clemsmall@hotmail.com |
| Ask Bob | Bob Grove | bgrove@grove-ent.com |
| Beginner's Corner | Ken Reitz, KS4ZR | ks4zr@firstva.com |
| Below 500 kHz | Kevin Carey, WB2QMY | wb2qmy@arrl.net |
| Bright Ideas | Gary Webbenhurst | ab7ni@arrl.net |
| Closing Comments | Bob Grove | bgrove@grove-ent.com |
| Communications | Rachel Baughn | mteditor@grove-ent.com |
| Computers and Radio | John Catalano | j_catalano@conknet.com |
| Digital Digest | Stan Scalsky | sscalask@mail.ameritel.net |
| | Mike Chace | mike@chace-ortiz.org |
| Easy Access Radio | Jock Elliott KB2GOM | lightkpr@nycap.rr.com |
| Fed File | Larry Van Horn, N5FPW | larry@grove-ent.com |
| Letters to the Editor | Rachel Baughn | mteditor@grove-ent.com |
| Milcom | Larry Van Horn, N5FPW | larry@grove-ent.com |
| On the Ham Bands | T.J. Arey, N2EI | tjarey@tjarey.com |
| Outer Limits | George Zeller | georgez@nacs.net |
| Plane Talk | Jean Baker, KIN9DD | jeanieandbob@earthlink.net |
| Programming Spotlight | John Figliozi, KC2BPU | jfiglio1@nycap.rr.com |
| QSL Corner | Gayle Van Horn | gayle@webworkz.com |
| Radio Restorations | Marc Ellis | mfellis@enteract.com |
| Satellite Radio Guide | Robert Smathers | roberts@nmia.com |
| Scanning Canada | John Corby, VA3KOT | johnndavidcorby@yahoo.com |
| Scanning Equipment | Bob Parnass, AJ9S | parnass@megsinet.net |
| Scanning Report | Robert Wyman | wymanent@bellsouth.net |
| SW Broadcasting | Glenn Hauser | wghauser@yahoo.com |
| SW Broadcast Logs | Gayle Van Horn | gayle@webworkz.com |
| The Fed Files | Larry Van Horn, N5FPW | larry@grove-ent.com |
| Tracking the Trunks | Dan Veeneman | dan@signalharbor.com |
| Utility World | Hugh Stegman, NV6H | utilityworld@ominous-valve.com |
| View from Above | Lawrence Harris | Lawrence@itchycocoo-park.freeserve.co.uk |
| Washington Whispers | Fred Maia, W5YI | fmaia@texas.net |
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By Bob Grove,
Publisher

The Con Game; No April Fool's Joke

It seems that the more technocratic our society becomes, the dumber – or at least more gullible – we become. As a former science teacher I must ask, what has happened to science education?

While we can forgive the Victorian-era consumer who was victimized by totally-unregulated patent medicines and quack therapy devices, modern America has every educational advantage at its disposal. Schools, libraries, consumer advocates, radio, television, magazines, newspapers, and the Internet burgeon with useful (and some useless) information. Still, the myths persist, and hucksters continue to profit from unsuspecting victims.

Perhaps most reprehensible are fellow American profiteers making money on the World Trade Center tragedy and the anthrax spin-off. Offers to sell pieces of the crushed buildings, worthless anthrax protectors (coconut oil, colloidal silver, oil of oregano, masks, and other undisclosed concoctions) have been widely reported.

While every high-school chemistry student should know that gasoline isn't magnetic, the magnetic "Fuel Optimizer," (advertised elsewhere as the "Fuel Miser," "Fuel Master," "MagnaSaver,") according to one advertiser, will:

- Improve gas mileage up to 25%
- Increase horsepower output
- Reduce engine heat
- Provide better and faster ignition
- Reduce carbon monoxide emission

My initial reaction is that it can't do anything but cost you \$19.99. So what do the experts say? And just who are these "experts?"

Liphardt and Associates, "a recognized laboratory of the Environmental Protection Agency (EPA)" (their quote), says the device, following EPA procedures, demonstrates mileage increases of 15-24%. This certainly would be good news if it works.

Liphardt maintains a web site on which they state that the tests were performed some 8 years ago on a 1991 Mercury "Zephyr" (sic). A visit to that site doesn't bring any technical details or even patent references.

We did check some other web sites, however, and Fuel Miser's was fascinating. "Magneto Hydrodynamic technology – Based on laws of physics developed and proven by Faraday, Van der Waals, Divac and Einstein," the hype continues. Sounds impressive.

So how does the Fuel Miser work? "The specific positioning of the magnets within the plastic casing of each magnetic half and the angle of the elliptical groove, in effect, cause one half to function as a transmitter and the other half as a receiver creating and driving a magnetic field perpendicular to the direction of the fuel flow."

Oh, so *that's* it!

So how come, with the improved fuel economy and cleaner

emissions regulations now imposed by the government on the automotive industry, we don't see such devices being implemented in automotive production? Wouldn't the military, federal government agencies, long-haul truckers, diesel locomotive lines, the airline industry, farm and industrial equipment manufacturers, bus lines, taxi fleets, and other consumers of petroleum welcome such a device?

While testimonials are quoted by the dozens, just like we see for quack medical concoctions, there seems to be a vacuum of testimonials from recognizable, reputable consumers and organizations who would benefit from such an invention. Claims for magnetic fuel savers have been around since the '70s. The Environmental Protection Agency (EPA) reports that they have tested over 100 ostensible fuel-saving devices, and none has shown any measurable improvement; in fact, continues the agency, some actually decrease performance and increase toxic emissions. The Federal Trade Commission (FTC) says to be wary of such advertising.

And then there's "Power Strip Gold," the cell-phone "antenna power booster" range extender, a stick-on plastic strip with little gold-colored traces that imitates printed circuitry.

"...technology that was battle-tested in Desert Storm" the ad says. Sound familiar? It should – that's the same pitch that was used for the now-mercifully-deceased "Power Tip" that was guaranteed to extend the range of any radio. Only it couldn't and it didn't.

So how does the tape strip work? "It mounts directly onto any cell phone and acts like a passive repeater to capture and re-radiate signals for unparalleled reception, range and clarity."

Now that's pure bunk. Your cell phone's antenna is already radiating, so why do you need to capture it and re-radiate it? Regardless of the claim, that circuit path printed on the little strip is obviously not resonant for the cell phone frequencies, and even if it was, the ink isn't even conductive!

Instructions accompanying the strip say to mount it under the battery compartment(!). Somehow I didn't think the \$14.99 sticky strip will work very well buried under that metal sandwich, but I decided to try one sent in by a skeptical reader. After all, maybe there's a chapter missing in the facts about electromagnetic radiation.

So how much improvement do you think it made? You guessed it – none.

Unless I'm very mistaken, someone who prints a non-conductive, non-resonant random pattern on a piece of plastic, and says to mount it so that it's shielded by metal, then promotes it for sale for \$10-\$20 as a cell-phone signal amplifier, either has absolutely no idea what he's doing, or is guilty of fraud.

I don't know about your email, but mine brims with junk every morning, including spams hawking the bogus cell-phone enhancer. How about you? Have you tried these devices? I'd hate to think that I've been unfair in my judgments.

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| R8500 | RCV 14 | \$1449.95 |

AOR

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SANGEAN

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|----------|-------|----------|
| ATS-505P | RCV 7 | \$129.95 |
| ATS-909 | RCV 8 | \$239.95 |

WINRADIO

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|--------------------|----------|-------------|
| WR-1550 (External) | RCV 47-E | \$549.95 |
| WR-1550 (Internal) | RCV 47-I | \$499.95 |
| WR-3150 (External) | RCV 48-E | \$1849.95 |
| WR-3150 (Internal) | RCV 48-I | \$1849.95** |
| WR-3500 (External) | RCV 49-E | \$2395.95 |
| WR-3500 (Internal) | RCV 49-I | \$2395.95 |
| WR-3700 (External) | RCV 50-E | \$2895.95 |
| WR-3700 (Internal) | RCV 50-I | \$2895.95 |

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| Satellit 800 | RCV 33 | \$499.95 |
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DRAKE

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| R8-B | RCV 3 | \$1349.00* |
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JAPAN RADIO COMPANY

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GE

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YAESU

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| VR5000 | RCV51 | \$889.95** |
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ACCESSORIES

ANTENNAS

| | | |
|---|---------|-----------|
| Active Duck | ANT 36 | \$39.95 |
| AOR SA7000 Super-wide receiving | ANT 39 | \$199.95 |
| AOR DA3000 Wideband Disccone | ANT 11 | \$129.00 |
| AOR MA5000 Wideband Mobile Whip | ANT 12 | \$99.00 |
| Create CLP51302N Log-Periodic Antenna | ANT 17 | \$299.95 |
| Grove Skywire | ANT 2 | \$29.95 |
| H800 Skymatch Active | ANT 15 | \$129.95* |
| Nil-Jon Super-M Superior Mobile Antenna | ANT 10 | \$79.95 |
| Optoelectronics Racing "Stub", 2.5" | ANT 18 | \$9.95 |
| Select-A-Tenna | ANT 21 | \$59.95 |
| Super Select-A-Tenna | ANT 40 | \$189.95 |
| 50' RG6U cable | CBL 50 | \$19.95* |
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MISCELLANEOUS ACCESSORIES

ICOM RECEIVERS

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| Remote control software for R75 | SFT 24 | \$59.95 |
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- AGC Function
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"A versatile HF/6-meter receiver that offers a good measure of performance in a compact package. All mode capability for the ham and utility listeners and synchronous AM for the SWLs should make the IC-R75 a popular choice for a wide variety of radio enthusiasts."— QST, 1/00

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- IF Shift
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- Selectable AGC Time Constant
- Digital Direct Synthesis (DDS)
- RS-232C Port for PC Remote Control with ICOM Software for Windows®

"If you want a receiver that is both a superior world band radio and a solid scanner, the new ICOM IC-R8500 is the best choice."

— Passport to World Band Radio, 1998

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— QST, 2/01

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IC-R10

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- Attenuator
- Alphanumeric Backlit Display
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